

THIS WEEK IN THE IRON AGE

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Editorial

The Big Boss 47

Technical Articles

Stain Analysis by Photogrid Method 50
Induction Furnace Heats 350 Slugs per Hour 55
Flame Cutting and Welding in Bulldozer Manufacture 56
Characteristics of Aluminum Bearings (Part II) 60
Reflectoscope Checks Plate Quality for Welding 64
British Patent Magnesium Joining Process 65
Surface Finishes for Aluminum (Part III) 66
Purification of Rhodium Plating Baths 69
Gantry Aids Welded Tank Production 70
British Labor Views The USSR Steel Industry 71A
Underwater High Frequency Tempering 76
New Equipment 77

Features

Newsfront 47
Assembly Line 82
Washington 86
West Coast 90
European Letter 94
Personals and Obituaries 98
Dear Editor 102
This Industrial Week 104
News of Industry 107
Gallup Polls 115
London Economist 117

News and Markets

Industrial Briefs 118
New Construction 119
Machine Tool Developments 120
Nonferrous Market News and Prices 122-23
Iron and Steel Scrap News and Prices 124-25
Comparison of Prices by Week and Year 126
Finished and Semifinished Steel Prices 128
Alloy Steel Prices 129
Fabricated Steel Products Prices 130
Warehouse Steel and Pig Iron Prices 131
Ferroalloy Prices 132
French to Increase Imports in Coming Year 134
Export of Cars Causes Complaints in Paris 136
Reveals Electric Catapult to Launch Planes 140
Reports New Car Registrations Off Sharply 144
Nelson Reveals Split Between WPB and War Dept. 145
Canadian Reconversion Nearly Accomplished 147
AFA Chapters Elect Officers for 1946-1947 150
Steel Exports Drop; Copper, Machinery Gain 158
French Steel Output Advances in July 159
British Main Railways to Convert to Oil Fuel 159

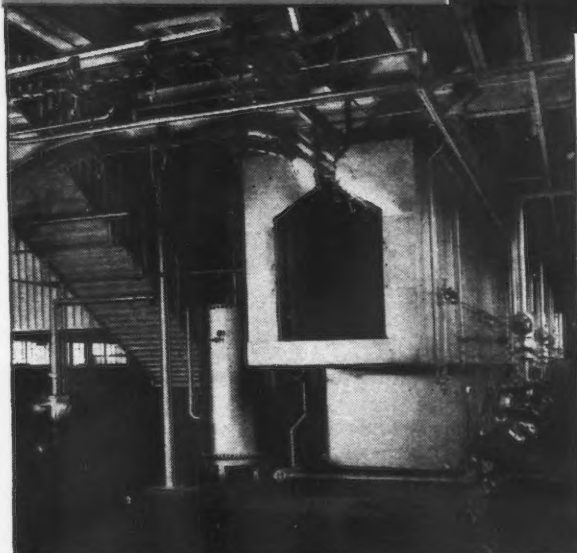
Index to Advertisers 235-36

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The Big Boss

SOMETIMES, after a prosaic day of doings with THE IRON AGE, I read myself to sleep via the pages of "who done it?" thrillers. Usually, the soporific effect, which I am told is better than sleeping pills, comes after a few chapters at most, in which the implication is that there is a sinister figure; a big boss, lurking behind the scenes.

The problem then, of course, is for the reader to detect the identity of the big boss before the author reveals it. If the author is a good one, that takes time and is not known until all of the suspects are summoned for the denouement.

In my own case, and I suppose it is that of many, once the purposes of Morpheus are accomplished, the book is forgotten and never finished. Good-bye to a two-bit investment! So we never know who the big boss really is.

I think that is true for the American public in relation to the identity of the big boss who pays our wages, salaries and dividends. We go to sleep and throw the book of economics away, which incidentally has never yet been published, before we unmask him.

I suppose that the majority of government employees think that the President of the United States is their boss and thus controls their economic destinies. And similarly that those who work for the United States Steel Corporation, or Bethlehem, or other companies down the line in size and importance regard the top man in each instance as the immediate arbiter of their economic fates. But they are wrong. For there is a big boss behind the scenes in each instance who is never advertised and seldom heard of. His name is P. Roduc Tivity, which is Greek to most of us.

He is the boy, and not President Truman, or Congress or the National Labor Relations Board, or the designated heads of business and industry, who can say what your actual wages, salaries, dividends or other income will be. And there is no getting around it. His decisions are as final as those of the Judgment Day, and far more logical than those of the umpires and referees of our championship prize fights.

This guy, P.R.T., has a calculating machine instead of a brain and is not influenced by friendships, by politics, by nepotism or by personal motivation of any kind. He controls the world's money bags and in plain language, he doesn't give a damn for anybody.

P.R.T. is one boss who has never lost a strike, nor even an argument. When you demand from him more than you deserve, he never says "no"; he just pays the demand in inflated tokens that will buy less, and then sits back and enjoys watching the outcome.

It would pay most of us to get better acquainted with this Big Boss and learn how to work with him. His money bags are practically inexhaustible and he would be glad to dish out the mazuma if we would work with him. But he is not going to come and ask you!

J. H. Van Deventer

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► Talk is already going around in private circles concerning the probability of another steel strike early next year. If living costs continue to rise a stiff increase will be requested by the union. Some sources believe that if the Republicans take over both houses this fall the chances of a strike will be diminished regardless of the course of union-management negotiations next year. However, this view is not universally held by the crystal ball gazers.

► Army Air Force ordnance engineers are studying potential weapons which they say may prove even more effective than the atomic bomb.

► Steel is slated as a target for scrutiny by the Senate War Investigating Committee which will probably plague American industry for political purposes for many years to come.

► It will be a long time before the 100 octane fuel developed during the war will drive the family car. The fuel is available, the engines are not. To make efficient use of 100 octane, designers say, they will probably need supercharging along with new piston materials, sodium-cooled valves and similar engine changes.

► Excessively prolonged exposure of welding electrodes to moisture affects the coating, which loses its stability and produces erratic results. Several thousand tests on AWS class 6000 electrodes indicate that the qualities most often affected by moisture are the number of fish eyes, ductility and penetration.

► Photogriding, a novel method of strain analysis developed at the Case School of Applied Science during the war, is particularly useful in studying strain over a whole contour in two perpendicular directions, as in press forming operations.

► A British patent has been obtained on a non-liquid metallic joining medium for the cladding or joining of metals, particularly magnesium alloys, according to a report in the British journal, Light Metals.

► Black markets in steel, involving sellers not connected with the mills, are expected to expand as priorities increase and regular customers are pushed further back in the waiting line. Scrap deals, over-large quotas and short circuited export steel are the basic ingredients. Some sources say total black market sales are less than 2 pct; others are sure they may soon comprise 6 to 10 pct of all small miscellaneous transactions.

► Labor turnover of veterans returning to their former jobs is no problem, but several sources indicate that it is a serious factor among men going to work in shops other than those in which they were employed before the war. In some steel mills the labor turnover in this category is reported to be in the neighborhood of 80 pct.

In the same vein, Charles E. Wilson of General Motors disclosed that a great number of veterans were "floating around" at GM's Linden plant.

► Steel finishing mills are experiencing a definite shortage of skilled labor which has caused serious cutbacks in the production of finished steel products.

► Against estimates made during the war that aluminum consumption by the construction industry would be about 9 pct of output, building has been using closer to 15 pct with allied industries such as building hardware, decorative, and non-structural manufacturers using about 10 pct more. This, based on bookings, evidences the greatest single industry increase in aluminum consumption. Transportation, probably because of shortage of other material, is using far less than anticipated.

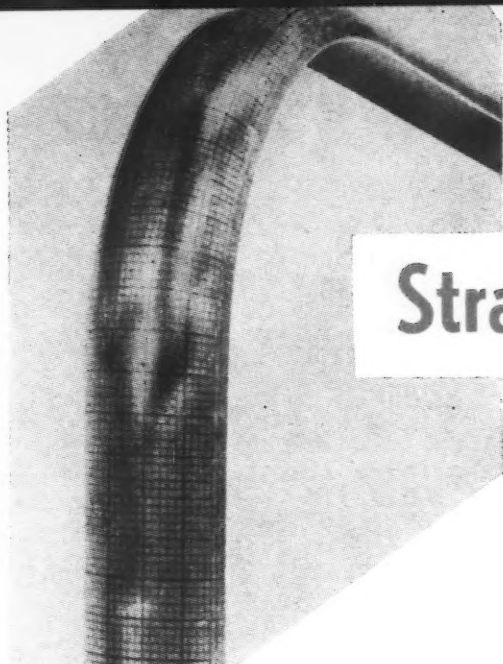
► Stalin is keeping his victorious generals and marshals strictly out of politics. Marshals are rewarded with jewels instead; some have the magnificent diamonds of the Order of Victory and Soviet marshals are now entitled to a ceremonial sword loaded with 98 rubies and scores of gems and semi-precious stones.

► Formed steel bathroom and kitchen plumbing fixtures with acid-proof enamel finish point a way to easing one shortage in the present building crisis. Lighter finished weight simplifies installation and effects a reduction in the quantity of metal drawn from the nation's short supplies.

► Development of color photomicrography has been hindered by the time lapse required in processing the color plates. Some photo authorities predict that developments due soon will sharply reduce processing time and will simplify the processing of color negatives.

► British troops in Japan are wondering if their presence is worth the inconvenience they are going through. They feel they are just "poor relations" to Uncle Sam, occupying damaged areas with inadequate housing and similar facilities.

► Frowned upon by the Dept. of Justice, WAA has reversed its March 25 approval of the sale of the government-owned Beltendorf, Iowa ordnance foundry to the American Steel Foundries and has disposed of the property to the Beltendorf Co., Beltendorf, Iowa, for \$1,200,139. The American Steel Foundries offered \$1,290,000 cash for the foundry.



Strain Analysis by Photogrid

AN evaluation of the metal characteristics for a given forming operation often requires that both the magnitude and distribution of the strains over the part contour be studied. Such information is also necessary for many of the tests performed in the metallurgical laboratory.

Thus, the distribution of strain over a whole contour in two perpendicular directions may be required or perhaps the strain over various gage lengths along a given axis. In addition, it is often necessary to determine the change in strain as a function of some other forming variable such as the applied load or the progress of stroke in a press operation.

All of these problems which relate to surface strains require that some reference marks or lines of known spacing be applied to the metal surface before forming in such a manner that the strain over a given length can be determined by measuring the distance between a pair of these lines after or during the progress of forming. Any such series of lines must possess the following important properties:

- (1) Sufficient accuracy and uniformity of spacing to yield the desired accuracy of strain value.
- (2) Be well delineated, of uniform width and remain defined after considerable straining has taken place.
- (3) Must not be destroyed by the forming operation nor by any medium in contact with the metal during forming.
- (4) Must not affect the metal properties to be studied.
- (5) In addition, particularly if any parts or specimens are to be studied, the reference marks must be easily and rapidly applied to large areas of the metal and to various contours.

The large amount of experimental work on the forming of aluminum alloy sheet carried on during the war at the metallurgical laboratory of Case School of Applied Science led to the development of a photographic process by which an orthogonal grid can be applied to the metal surface in somewhat the same manner as in the process of photo-engraving. Refinements of this technique led to grids possessing all of the previously mentioned qualities and to process which yielded gridded specimens in large quantities and requiring only unskilled labor.

The method employed involves the application of a light sensitive emulsion to the metal surface, the contact printing of a negative of the required grid and final development of the grid in an ordinary black dye solution. Also, several special techniques of strain measurement were developed in connection with studies of the tensile test and certain bending processes.

Experimental work carried out at the Case School required the production of grids having 4, 10, 20 and 100 lines to the inch. The grid negative having four lines to the inch was prepared by ruling with India ink mutually perpendicular lines having a spacing of $\frac{1}{4}$ in. on tracing cloth. The tracing cloth was then contact printed on cut film yielding a negative. However, for grids of such large spacing, the tracing cloth itself may be used; the resulting grid having white lines on a black background. This simple method yields satisfactory results when great accuracy is not required and where the spacing of lines is $\frac{1}{8}$ in. or greater.

The 20-line negative was produced by contact printing, on cut film, accurate black on white 20-line-to-the-inch orthogonal graph paper with $\frac{1}{2}$ -in. lines heavily ruled. Negatives 18 x 20 in. were made by this process. Since these negatives become scratched and dirty with continued use a master celluloid positive was made and used to produce additional negatives. These negatives were found to be surprisingly constant with variations in temperature and atmospheric humidity. The maximum variation noted between 60° and 100° F was less than 0.01 in. in a 1-in. length. Negatives of 100 lines per in. required a great deal more accuracy and were produced by first ruling a 100-line-to-the-inch grid with a dividing engine.

A celluloid positive was made from the master plate and from this, 7x9-in. celluloid negatives were produced as needed. It was found convenient to further define such a fine grid by having the $\frac{1}{4}$ in. lines heavy. This was accomplished by ruling out every 25th line on the negative with black ink, thus making these lines appear white on the metal surface, as shown in fig. 1. A negative produced in this manner has its accuracy limited only by that of the dividing engine used to prepare the glass grating.

In general, any desired mark may be made on a celluloid negative of the types described with either India ink or by scratching the desired design in the negative emulsion with a knife blade. The latter method was used to produce arrows indicating the grain direction on the 20-line negatives. While negatives produced in this manner wear quite well, it is sometimes necessary to clean their surface. This can best be accomplished by lightly swabbing with

Method . . .

By W. F. BROWN, JR. and M. H. JONES
Dept. of Metallurgical Engineering, Case School of
Applied Science, Cleveland

In this, the first published report describing the use of photogridding for strain analysis, the technique of applying the grid to a metal surface and subsequent strain measurement are discussed. The process was developed in the metallurgical laboratory of the Case School of Applied Science in connection with research work carried out under contract with the War Metallurgy Committee.

absolute (200 proof) ethyl alcohol. The size of a 20-line-to-the-inch negative is limited only by the photographic equipment available since it is possible to join sections of the graph paper to be printed with cellulose tape. Similarly, the maximum size of a 100-line negative is determined by the limitation of the dividing engine. However, several negatives of limited size may be joined with cellulose tape to grid an extensive surface. Measurements in the immediate vicinity of the parting lines are impossible and therefore these regions on the grid should be located in uncritical areas on the metal surface.

The following formula was found to produce a satisfactory stock solution of emulsion which may be stored, until used, either full strength or diluted to suit the particular application:

Water	.....23 parts by weight	9 L
Photo-engraver's glue	..... 4 parts by weight	16 gms
Ammonium dichromate	..... 1 part by weight	4 gms
Ammonium hydroxide	..... 1/4 part by weight	1 gms

For most applications, this stock solution is diluted as follows:

Stock solution	..... 2 parts by weight
Water	..... 3 parts by weight
Ethyl alcohol	..... 4 parts by weight

In diluting, the water should be added first and the alcohol last. The light sensitivity is not great enough to require that preparation of the stock solution be carried out under darkroom conditions. However, direct exposure to high intensity ultra violet radiation, such as sunlight, should be avoided. The emulsion, either diluted or undiluted, may be stored in a cool, dark place for several months. For certain applications where an emulsion of low surface tension is required, the stock solution may be further diluted or any one of several photographic wetting agents may be added.

Preparation of the Metal Specimens

Perhaps no other phase of the gridding technique is as important as correct preparation of the metal surface, and undoubtedly incorrect procedures account for a majority of failures.

To yield a successful grid, a surface must possess the following properties: (1) Absolute freedom from

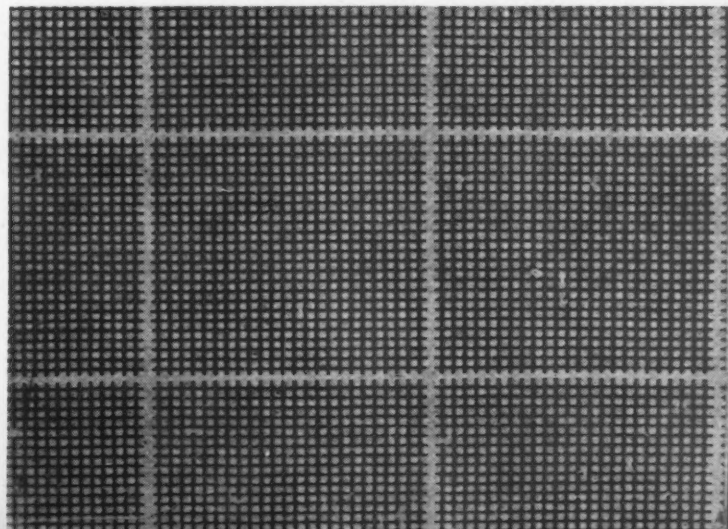
grease or the emulsion will not adhere; (2) absence of surface irregularities or defects of such magnitude as will prevent good contact between the negative and the metal during exposure and prevent proper delineation, and (3) absence of any porous material which will tend to absorb the dye and darken the background.

The method used depends somewhat on the metal to be gridded. However, the best general technique discovered involved scrubbing with steel wool and ordinary scouring powder, using enough water to keep the entire surface wet. A clean surface will exhibit a uniform water film when rinsed. It was found that certain alloys and probably most pure metals could be successfully cleaned by etching with a suitable reagent. For some alloys, however, resistant phases were left on the surface as a porous or darker layer.

Drying may be carried out either in air or, if elevated temperatures are not objectionable, in an oven. A prepared surface should be protected from too long exposure to the atmosphere, as it was found that on aluminum alloys, atmospheric oxidation in a period of 12 hr will render the surface unsuitable for gridding. It is preferable to apply the emulsion immediately after scrubbing or etching.

The emulsion diluted in the manner previously described, may be applied to the surface by several methods. Two standard procedures were adopted. For large sheet areas a spray gun was used and a damp cot-

FIG. 1—The 100-line grid with heavily ruled 1/4-in. lines (5X).



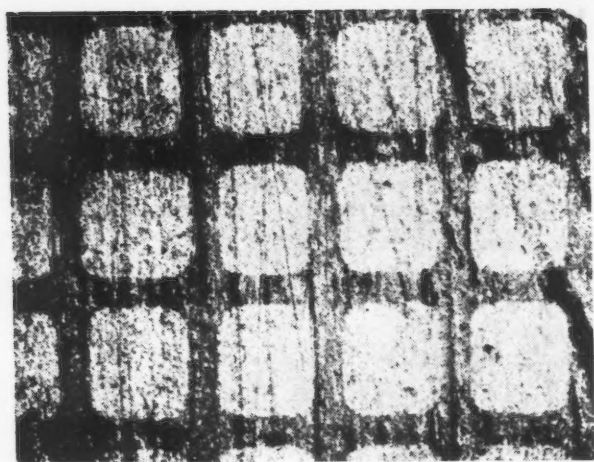
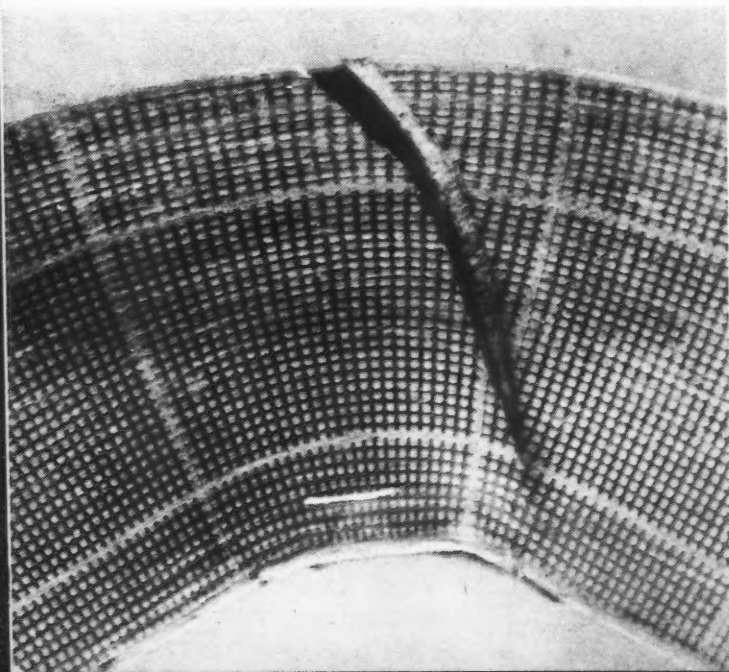


FIG. 2—Examples of a satisfactory (top) and an unsatisfactory 100-line grid (70X).

ton or chamois swab was employed to even the coating. For smaller areas, the emulsion was applied directly with a cotton swab. The most important consideration is that all portions of the surface be covered with emulsion. Slight non-uniformities in thickness are not serious. However, if the emulsion is excessively thick, the entire surface will absorb the developing dye and the grid lines will be obscured in a general

FIG. 3—The 100-line grid on the lateral surface of a narrow rectangular section bent to failure.



fog. In addition, it was observed that in such cases the grid may be easily removed by water or handling. On the other hand, a very thin coating will result in low density lines. In general, visual examination of the coating will reveal poor coverage. The film should be of sufficient thickness not to exhibit interference colors, and the yellow color of the emulsion should be easily visible. Application is best carried out in subdued light, but ordinary photographic precautions are in no way necessary.

Specimens to be gridded on more than one surface usually present no problem. Each surface is prepared and exposed individually, the finished grid being protected with a film of clear lacquer.

The emulsion may be dried either in still air or, if a more rapid drying is desired, in an oven at temperatures not exceeding 200°F.

It was found that some persons may exhibit a reaction upon inhalation of the mist produced by the spray gun. This was manifested by a slight nasal irritation. The use of a mask having water dampened cotton filters completely eliminated the symptoms. No epidermal reactions to the emulsion were observed.

Prepared specimens may be stored in a dark place for not more than 24 hr. Care should be taken to prevent exposure to sunlight, for even a very short exposure is sufficient to cause blackening of the entire surface on development.

Correct Exposure and Development

Exposure may be carried out with any source of high intensity ultra violet radiation. The light from a 15 amp, 80 v carbon arc was used in this laboratory. Specimens having flat surfaces were held in a rectangular blueprint frame backed with heavy felt. Distance from the arc to the frame was about 2½ ft, the light source being centrally located with respect to the frame. Exposure time, fortunately, is not a critical factor, as long as it is sufficient to cause complete reaction. However, variations of this factor may be used to control the degree of line fineness. The shorter the exposure, the finer the grid. No rules can be set forth, but it was found that exposures of less than 30 sec were insufficient to delineate all portions of the grid while times as long as 15 min darken the background. Undoubtedly the surface character (reflectivity) of the material being gridded is a factor which influences the exposure time, but experience with aluminum, brass, copper and steel surfaces indicates it to be negligible.

Several specimens may be exposed simultaneously using one or more negatives. It is of extreme importance that uniform contact be maintained between the specimen and the negative, as poor contact results in poor delineation. Rectangular areas having a width of only 0.032 in were successfully gridded with the 100-line-to-the-inch net. Such thin sections when gridded in the thickness direction were supported on both sides with wood blocks.

Several procedures have been developed for application of grids to singly curved and cylindrical surfaces. If the curvature is not too great, the negative may be wrapped tightly around the specimen and fastened in place with cellulose tape. The specimen is then slowly rotated in such a manner that all areas receive an equal exposure to rays in a plane normal to the surface. A second method is to enclose the arc in a box having a long narrow slit over which is mounted

the negative. The specimen is then placed in contact with the slit and rotated at such a speed that all areas receive sufficient exposure. Exposed surfaces are best developed immediately. Exposure to sunlight for even short periods may result in reversal or solarization upon development.

Ordinary black dye is used to develop the grid. Diamond dye dissolved in boiling water, 1 oz of dye to 1 qt of water proved to be entirely satisfactory. Development in warm dye is more rapid. However, if heat will alter the metal properties, the dye may be successfully used at room temperature. The exposed section is first rinsed in cold water and then the dye poured over the surface, enough generally being used to cover the whole specimen.

Development time is not critical except that too long a time in hot dye may darken the whole surface. About 2 min in cold dye should be sufficient. Excess dye is rinsed off in cold water and the surface lightly swabbed with cotton. The grid may tend to rub off at this point and care should be taken to protect it until thoroughly dry. Again a drying oven may be used to hasten the process if desired.

Some examples of the 20-line and 100-line grids produced by the prescribed techniques are shown in fig. 2 to 4. Fig. 2 shows an enlarged view of satisfactory and unsatisfactory 100-line grids. Fig. 3 shows the deformed 100-line grid on the lateral surface of a bent aluminum rectangular bar. A large number of different shapes were subjected to analysis with the 20-line grid. Two examples of these are shown in fig. 4, including a rotostretched stringer and a hydraulically formed bulge.

The grid as produced by the prescribed technique is resistant to oil (up to 600°F) and most other lubricating compounds with an oil base. To obtain stability in water, the grid can be fixed in a 10 pct solution of formaldehyde and water for several minutes.

As long as a film of lubricant covers the two contacting surfaces, the grid will remain intact during a forming operation. If it is desired to machine gridded specimens, the surface may be protected by an application of a thin coat of lacquer which need not be subsequently removed unless it interferes with the forming operation. In general temperatures above 600° F. tend to destroy the grid outlines. Fixing in formaldehyde appears to have a beneficial effect at elevated temperatures.

Techniques of Strain Measurements

While many unique problems of strain measurement each requiring individual consideration, are encountered in practical forming, certain fundamental procedures, using the photogrid, were developed in our metallurgical laboratory. In particular, the accuracy which can be expected of both the 20-line and 100-line grid was carefully investigated for several commonly used gage lengths and methods of strain measurement.

Several methods of measurement may be successfully used to determine the final spacing of the grid lines over a given gage length, and the selection of a suitable technique depends on the accuracy desired, the gage length selected, and also on the contour of the specimen.

The selection of a suitable gage length depends on the nature of the strain distribution and the accuracy of the results desired, and in general is subject to the

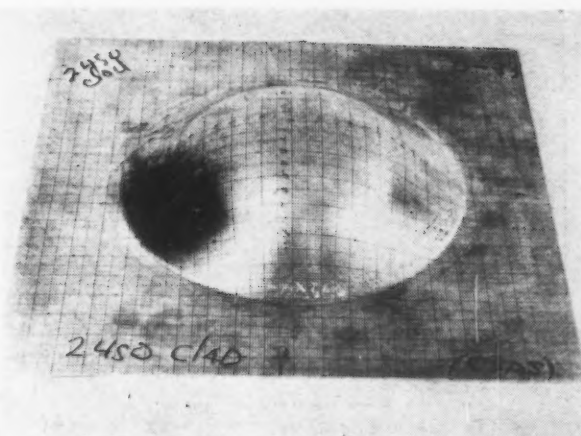
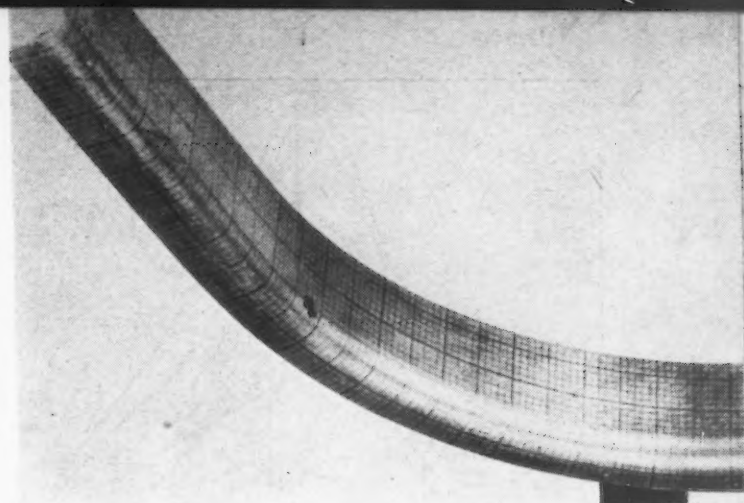


FIG. 4—Use of the 20-line grid in the strain analysis of sheet metal parts. At the top can be seen the 20-line grid on a stretch formed angle and at the bottom on a hydraulically formed circular bulge. The 20-line grid on a stretch formed U-section heads the article.

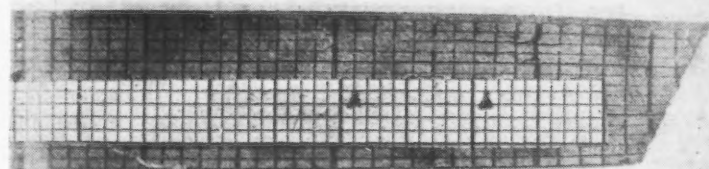


FIG. 5—Strain measurement over a 1/2-in. gage length on a 20-line grid with a tape.

following two considerations: (1) The gage length should be short enough to reveal any local variations in strain and (2) the accuracy of the measured strain will be inversely proportional to the selected gage length. In addition, the method of measurement employed may also limit the gage length.

For grids having a spacing of 20 lines or less, the most rapid method of strain determination was found to be comparison of the deformed grid with a paper tape identical to the undeformed grid. Thus, an ordinary strip of graph paper was used to measure the strains on the 20-line grid. This method is rather flexible, and the strains over a curved surface may easily be determined. The use of a tape easily permits the choice of a large number of gage lengths.

It was found that the shortest gage length yielding results of sufficient accuracy was 1/2-in. Using this gage length, an operator with only moderate experi-

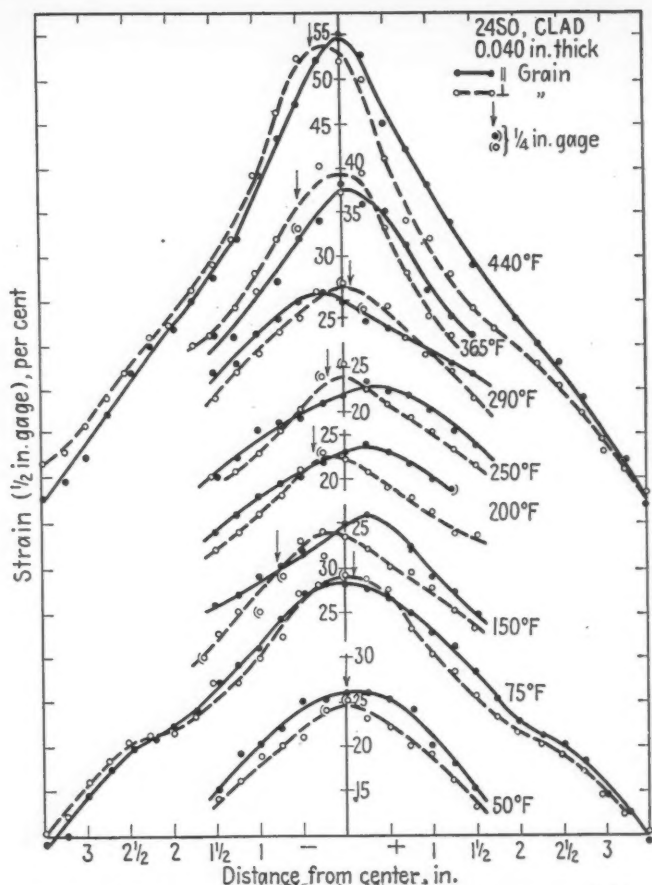


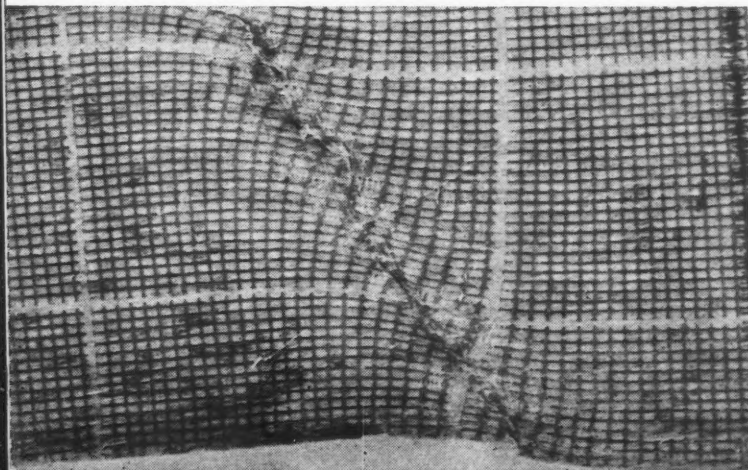
FIG. 6—Surface strain distribution for circular bulges of 2450 clad, hydraulically bulged at various temperatures.

ence can read strain visually to ± 1 pct, this combined with the possible error of ± 1 pct (strain) in grid accuracy yields results accurate to at least ± 2 pct.

Fig. 5 shows the deformed 20-line grid on the surface of a tensile specimen with a tape in position for strain measurement over a $\frac{1}{2}$ -in. gage length. It will be noted that the lightweight lines are compared: To facilitate this process pencil marks $\frac{1}{2}$ -in. apart distinguish the original gage length on the tape. Each square on the tape represents 10 pct strain for this particular gage length. Stations on the specimen may be either marked with ink or, if a large number of identical specimens are required, the numbers can be scribed directly on the negative.

Fig. 6 shows typical strain distributions along two perpendicular meridian lines over the surface of 6-in. diam hydraulically formed bulges (fig. 4) formed at various temperatures. Many die-formed and rubber-formed parts possessing rather large radii of curva-

FIG. 7—Deformed squares of a 100-line grid in the necked region of a tensile specimen showing rather large shearing strains.



ture were subjected to a similar analysis, with the 20-line grid. These grids were found to remain well delineated, even after 80 pct strain on an aluminum surface. However, if the metal grain size is very large, the resulting orange peel surface may render correct interpretation difficult.

The use of the 100-line grid required the development of much more complex and accurate methods of strain measurements. Since this grid is most often used to investigate rapid local changes in strain, as are encountered in a sharp bend or in the necked area of a tensile specimen, the shortest possible gage length is generally desired. A 50-power metallurgical microscope provided with a Bausch & Lomb Filar micrometer eyepiece was found suitable for measuring a gage length of 0.01 to 0.08 in. depending on the problem considered.

Fig. 2 shows the grid as it appears under the microscope. The hair line of the Filar is used in such a manner that it bisects vertical black lines. Accurate settings are, therefore, considerably dependent on the uniformity of line width, and definition of line edges. A grid such as that designated as poor in fig. 2, is of little value in this respect.

Stations on a 100-line grid, if the gage length is greater than $\frac{1}{100}$ -in., were conveniently scribed on the surface of a formed specimen using the grid as a guide. However, any scribed lines should not extend into areas subject to analysis but merely serve as reference marks.

Measurement of strains with the 100-line grid on flat parts usually presents no problem, especially if the measuring microscope is equipped with a movable stage. However, a curved section, particularly if the radius is small, requires a special mounting fixture. Any such device should permit rotation of the specimen in such a manner that the center of the gage length to be measured is in a plane perpendicular to the longitudinal axis of the microscope tube. A rather simple fixture, found to be entirely satisfactory, was so constructed that the curved section could be mounted in molding clay on a small rod pivoted in a steel frame. Thus, sections of various sizes were easily accommodated.

In some cases where there is considerable shearing strain as in the necked region of a tensile test, (fig. 7) a grid square may deform into a parallelogram. From measurements of the length of each side of the parallelogram and determination of the angles, it is possible, by a rather tedious procedure, to calculate the magnitude and direction of the principal strains. It was found that the principal strains differed from those measured in the directions of the grid by less than 2 pct (strain) for large strains (greater than 50 pct) and for changes in angle up to 20° .

The accuracy of the final measurements with the 100-line grid often depends on characteristics of the metal surface in addition to the factors of grid reproducibility and gage lengths already discussed. Thus, it was found that strain measurements on small radii present in rolled-formed sections were often very difficult because of excessive orange peel and surface checks. The limiting accuracy that can be attained under the most ideal conditions was found to be ± 0.1 pct strain for a 0.6 in. gage length. This requires the measurement of each interval before and after straining on a perfect grid and for strains not exceeding 20 pct. In general, this accuracy is not required and the measurement of the undeformed

Circumferential strain, per cent

Biaxiality, S_2/S_1

F

grid an form app leng was For was leng be (fig

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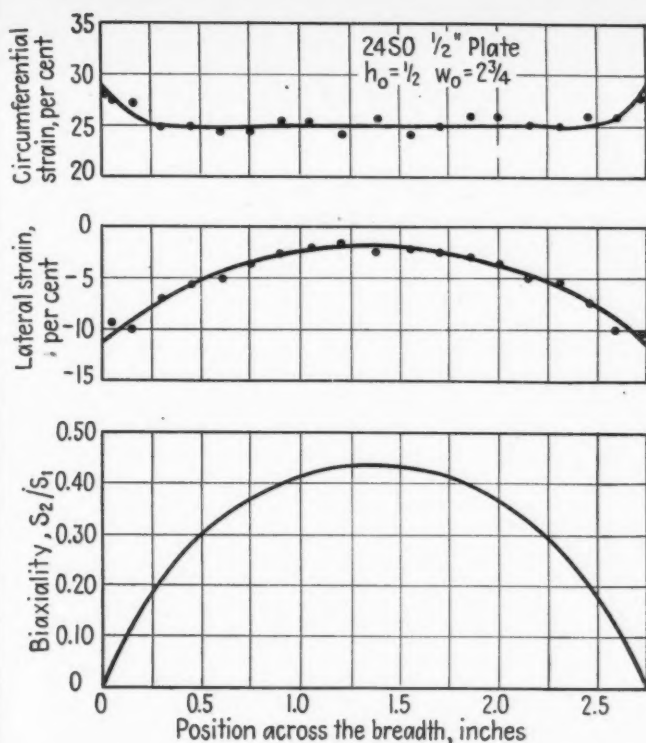


FIG. 8—Conditions of strain and biaxiality on the tension surface of a bend.

grid may be neglected. This was found to introduce an error of approximately ± 0.4 pct due to non-uniformities in the grid. Thus, the total error will be approximately ± 0.5 pct (strain). Where a gage length of 0.01 in. was required, the limit of accuracy was ± 2 pct even for small strains on a good grid. For larger strains (greater than 50 pct) the accuracy was somewhat less namely ± 3 pct for a 0.02-in. gage length or for cases of extreme distortion as would be encountered in the immediate vicinity of a fracture (fig. 7), the scattering may be as high as ± 10 pct

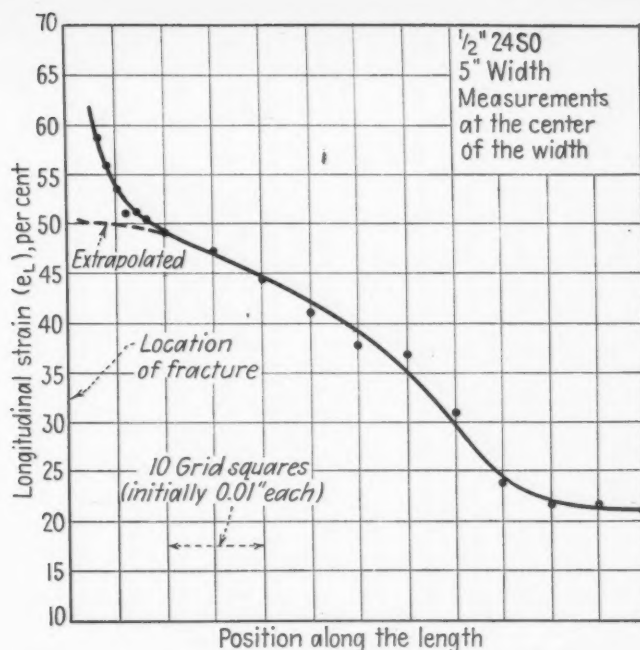


FIG. 9—Distribution of longitudinal surface strain near the fracture of a wide tensile specimen.

strain. In such cases, a large number of measurements are necessary to obtain a reasonable degree of accuracy.

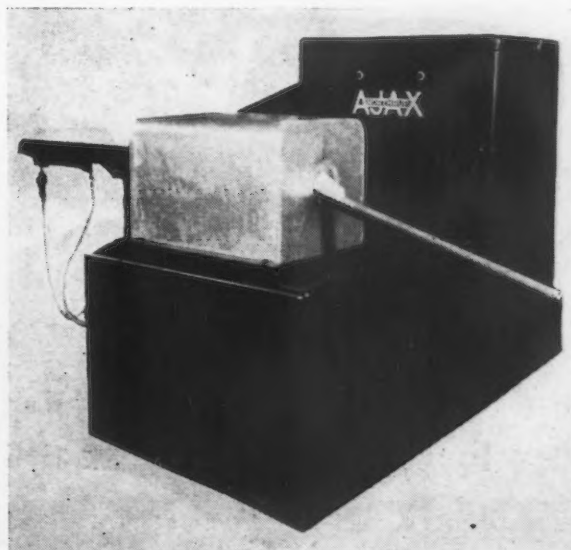
Fig. 8 shows the distribution of circumferential and lateral strains on a bent rectangular specimen along with the calculated biaxiality across the breadth. The distribution of longitudinal strain in the vicinity of the fracture for a wide tensile specimen is shown in fig. 9. These curves illustrate typical research laboratory applications of the 100-line grid. In addition, as previously mentioned, many production strain analysis problems, such as those encountered in bending and stretch flanging, require the 100-line grid.

Induction Furnace Heats 350 Slugs per Hr.

A PRODUCTION rate of 350 pieces per hr is reported in heating slugs $3\frac{3}{8}$ in. diam by $1\frac{1}{4}$ in. long to about 2200°F in an automatically timed Ajax-Northrup induction heater installed in a forging shop. This high frequency heater is shown in the accompanying illustration. Slugs are loaded into an inclined roller type conveyor on one side of the furnace, which feeds them into one end of the heater. At automatically timed intervals a pneumatic ram pushes a cold slug from the bottom of the conveyor a short distance into the coil, causing a heated slug to be ejected at the other end of the unit. Slugs from the exit end of the furnace slide down an inclined chute to the forging machine.

The power source is a 200-kw motor-generator unit operating at 1000 cycles per sec. The heater consists of a streamlined, steel enclosed cubicle containing capacitors, controls, timing device and necessary connections for heating the coil proper. To permit heating several sizes of slugs, the unit is provided with three different heating coils which may be interchanged. The heater is designed for maximum efficiency with slugs cut from $1\frac{3}{4}$ in. and $2\frac{5}{8}$ in. square bars and $3\frac{3}{8}$ in. diam rounds. Four carbide-faced water cooled tubular rails

guide the slugs as they pass through the heating coils and keep the work pieces from dragging on the refractory lining.



Flame Cutting and Welding in

FIRST to mount blades on tractors, and the pioneer of snow moving equipment in America, the Baker Mfg. Co. has relied on welded fabrication extensively to insure strength to withstand the exacting service requirements of bulldozers, grade-builders, road maintenance machinery and similar equipment. The bulldozer in particular must be designed to endure under abuse. With welded fabrication Baker provides the answer by joining structural members into one solid, integral unit which will take harsh wear day after day without failure.

Prior to 1927, rolled steel sections were used in conjunction with castings and riveted joints in the manufacture of Baker equipment. Sheared and loosened rivets together with casting failures led to a thorough investigation of welded construction. It was found that this type of construction not only solved these problems but provided a considerably less expensive fabricating method with greatly improved appearance.

In the design of bulldozers and allied equipment many factors must be taken into consideration which, when summed up, call for a method of fabrication providing maximum strength with minimum weight. The hydraulically controlled bulldozer must be able to withstand the full forward thrust of the tractor. Such tractors range in size up to 150 hp and develop as much as 3500-lb drawbar pull or push. In service the weight of the entire front end of the tractor is often exerted on the bulldozer blade. Correct analysis of the direction of forces and the impact resistance necessary to counteract shock forces must be determined and compensated for in designs to keep unit stresses as low as possible. Balance must be carefully determined on equipment mounted directly on tractors, and the weight distributed so as not to affect the center of gravity of the prime mover to any significant degree. The unit must also be as light as possible and still possess the required strength, re-



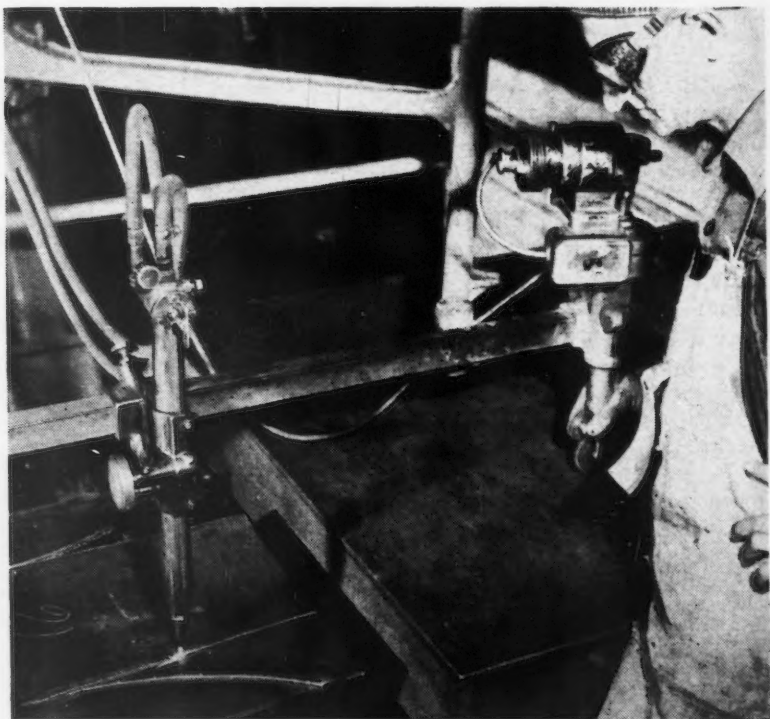
ABOVE

FIG. 1—Bulldozer parts such as these are economically flame cut to shape on oxy-acetylene cutting machines. Grinding and other finishing operations are reduced to a minimum.

o o o

RIGHT

FIG. 2—Oxygraph equipped with manual tracing device cutting bulldozer member.

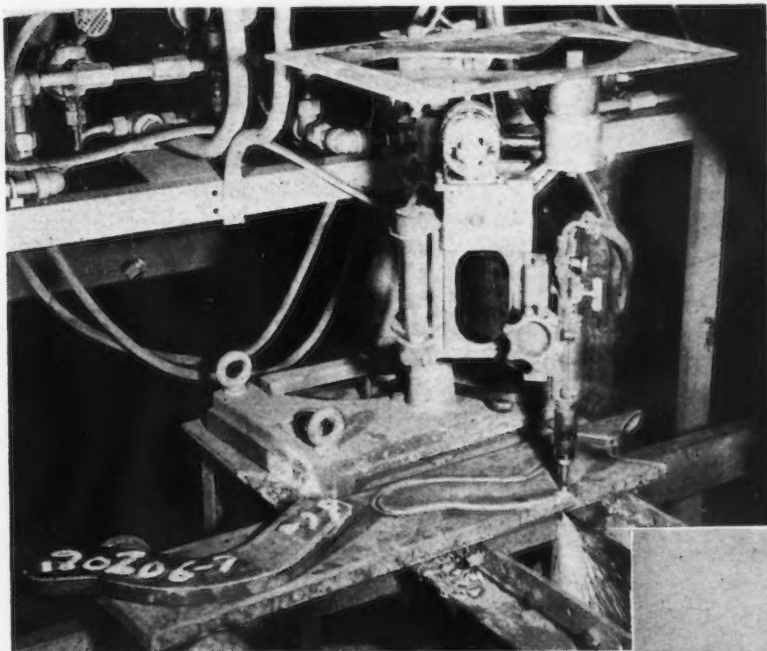


Bulldozer Manufacture

quirements which definitely favor structural welding. Other methods of fabrication gain strength at the expense of added weight which will cause the tractor to pitch and roll in severe service.

One of the chief advantages of flame cutting and welding in the manufacture of this type of equipment is the fact that high strength steels in the 30 pct C, 1.7 pct Mn class may be quickly cut and fabricated at low cost.

The flexibility of the process in manufacturing makes possible full exploitation of production control methods and manufacturing techniques best suited to the company's particular requirements. For example, flame cutting and welding permits maximum control of production through full use of standard rolled shapes which also simplifies material procurement, as a large number of parts formerly purchased outside are now manufactured in the plant. Any casting may be duplicated by welded assembly and the employment of welding in fabrication permits practice of the technique known as jumping in, or inserting small flame cut sections or plates and welding them to the assembly, without



ABOVE

FIG. 3—Camograph flame cutting machine is well suited to production cutting of small shapes.

RIGHT

FIG. 4—Heavy jigs are employed to hold parts of bulldozer upright member within limits of 1/32 in. during tackwelding operation.



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Use of flame cutting and weld fabricating methods in the construction of bulldozers and other heavy road machinery are described in this article. Reasons for the adoption of this fabricating method—including simplification of manufacturing processes and improved quality of product—are discussed.

difficulty. This is of particular value in the assembly of intricate parts consisting of several pieces.

Low cost production of irregular shaped parts has been made possible with oxyacetylene cutting machines which can cut almost any shape quickly and accurately, thus eliminating many costly machine tools and the time formerly required for tooling operations.

In contrast to shops which employ large assembly drawings for cutting, forming and machining, Baker has found the use of individual shop drawings of each part considerably easier to handle. Knowledge of just how many of each piece go into each sub-assembly, and on down into the final assembly, is obtained from specification books and assembly drawings. As the finished parts stores are limited in space, production is controlled so that the smaller parts are run through in larger quantities, the large parts being confined to small quantities, and thus the cutting and forming shop is always kept

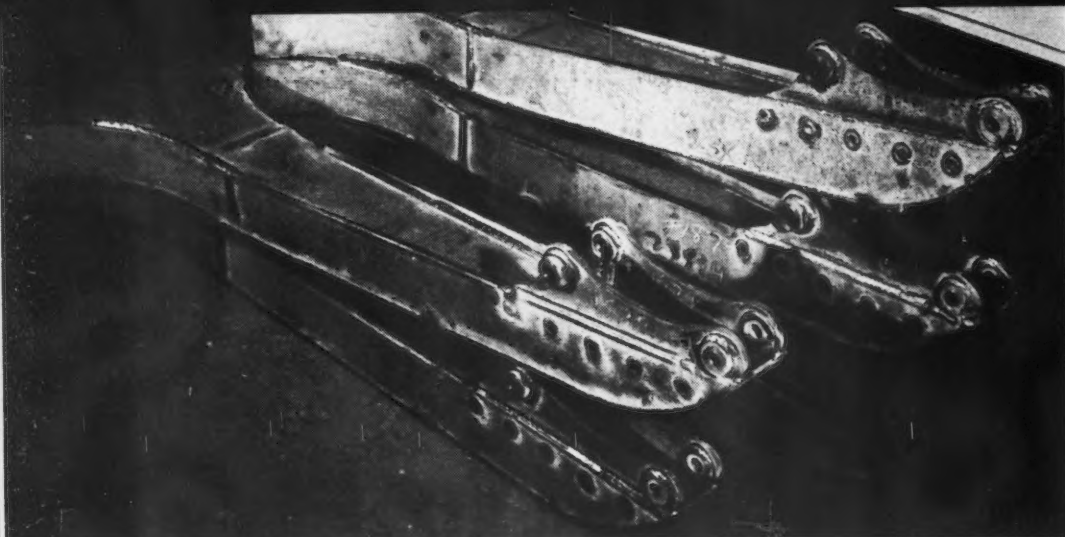


FIG. 5—Finished uprights showing plug welds used wherever additional rigidity is required.

busy. This system of production control is well adapted to this particular plant which keeps a perpetual inventory based on individual parts sent to finished parts stores, and subassemblies consisting of two or more welded parts stocked in finished product stores. Several typical individual flame cut bulldozer parts may be seen in fig. 1. Some of these parts are cut from structural shapes, some from plate and some are formed after cutting.

The factory setup for handling flame cut and welded subassemblies is very simple. The parts are laid out and flame cut in the cutting and forming shop which includes punches, rolls, breakers and a hot-forming furnace, as well as oxyacetylene cutting machines. Further forming operations, if necessary, are performed here, and the parts are then sent to the machine shop if machining, drilling or other finishing operations are required. Parts for subassemblies are then tack welded before final welding with the aid of jigs to position the larger jobs. Subassemblies are then sent to the paint department, and finally to finished product stores, from which they are drawn out as required for final assembly. Through close control of manufacturing processes by welded fabrication, many parts can be manufactured to assembly tolerances without machining. This greatly facilitates final assembly. As the nature of this company's products does not vary greatly from year to year, quite a few cut and welded finished subassemblies are kept in finished product stores, ready for final assembly.

The flame cutting and welding process is not confined purely to production work but is also relied upon for general maintenance and fabrication of plant equipment. When the overhead conveyor system did not work out satisfactorily, company engineers designed and constructed gib cranes to suit their particular requirements with flame cutting and welding equipment. The arcwelded hot-forming furnace was also designed and built by the company, and practically all jigs and fixtures are fabricated from rolled steel sections.

In the manufacture of Baker equipment, Oxygraph and Camograph flame-cutting machines have been proved well adapted to production cutting requirements. In Oxygraph cutting, the part is reproduced by guiding the tracing spindle against a template or, on very large parts, the torch is guided along lines chalked directly on the work from prick punch marks. Fig. 2 illustrates an Oxygraph cutting wedges in a strut plate which forms one of the main members of the bulldozer assembly. As this is a large cut the line of cut has been scribed directly on the plate.

The Camograph is well adapted to volume production cutting of small parts. Steel templates for such parts are made for use with a magnetic spindle. The operation in fig. 3 illustrates a typical job for which the Camograph gas cutting machine is particularly well suited. These parts are lugs for cylinder carrying brackets. The steel template and magnetic tracing spindle may be seen at the top of the machine. Note



FIG. 6—Finish welding a 3200-lb moldboard which is interchangeable on bulldozer and grader. Note the liberal use of plug welds.

the slight bend introduced in a press on the lug at the left. These units are also used to cut openings in structural shapes.

Arcwelding equipment and electrodes conforming to E6010 and E6012 classifications are used exclusively in fabrication of subassemblies and final assembly of these flame cut parts.

The operation in fig. 4 shows one of the bulldozer upright members in the process of being tack welded in a jig. All welded assemblies requiring close tolerances are set up in jigs, and tolerances of 1/32 in., and in many cases closer, are not uncommon. Such tolerances are maintained through use of suitable jigs such as shown in figs. 4 and 8, and proper welding sequence. The plug welds which may be seen in fig. 5 provide added reinforcement necessary to insure the required rigidity in this part which is heavily stressed in service. In the welding of the upright to the pushbeam, both parts are first tack welded in place on a portable fixture.

Fig. 6 illustrates the finish welding operation on a 3200-lb bulldozer moldboard. One of the largest pieces of the assembly, these all-welded moldboards for bulldozers and gradebuilders are interchangeable on the same frame and have been designed so that the changeover can be made in a matter of minutes. This design feature, which permits a quick conversion from bulldozer to gradebuilder or vice versa, has proved especially popular in municipalities where there is some doubt as to the appropriate machine to buy, or where limited funds prevent a heavy investment in road machinery.

In fig. 7 a carrying bracket for the hydraulic cylinder is shown being tack welded in a special jig designed to accommodate both left and right brackets, using the same locating pads in some cases. The complete bracket is made up of flame-cut plate sections, some of which have also been formed as illustrated in fig. 3. The finished right-hand bracket in fig. 8 indicates the thickness of these welded sections which are heavily stressed in service and subjected to as much as 19,000 lb cylinder pressure per bracket. This bracket has four bolting surfaces, no two of which are in the same plane. All holes are drilled or punched in the individual pieces and set up in a jig. The two holes at the top are held to within a 0.005-in. tolerance on diameter and aligned in the jig. Fabrication of these brackets from flame cut, welded pieces eliminates much machining formerly required on cast brackets.

Welding a steel casting in the bottom of a hydraulic cylinder tube is performed after the tube has been completely finished on the inside by a special rolling process. This process is greatly simplified by having the tube open at both ends, which would not be possible if it had been cast. The cylinders are tested at 2500 psi.

Universal joint parts are also welded into assemblies, eliminating the former practice of casting the whole piece. Close tolerance holes are made in the parts before they are lined up for welding in a jig. Aside from greatly reducing the total cost of the piece by eliminating the considerable amount of machining formerly required, welded fabrication has also solved the casting breakage problem.

Although the production of welded bulldozers has been stressed here, the economy and advantages of welding and flame cutting in the manufacture of other types of Baker road equipment have resulted in equally important sales and maintenance features.

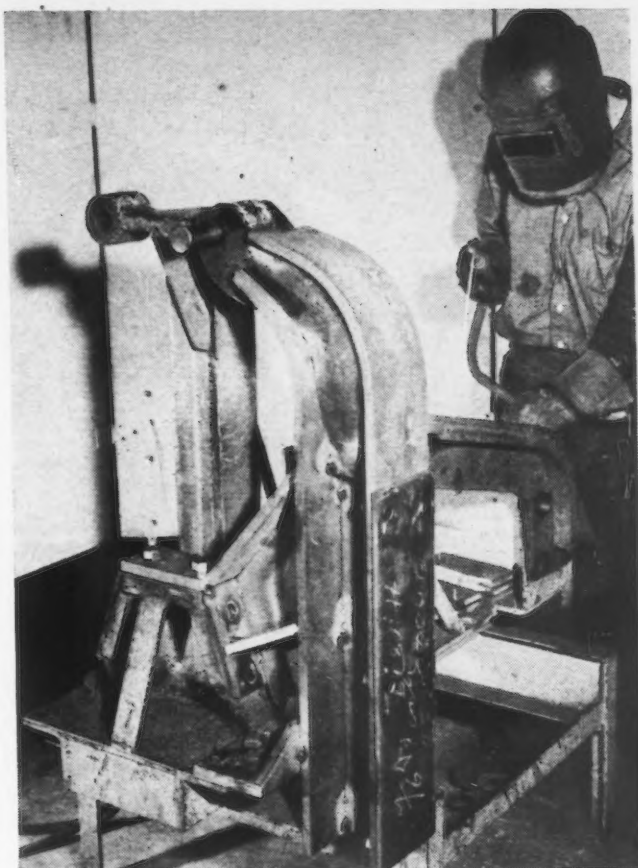


FIG. 7—Tack welding hydraulic cylinder carrying bracket. Jig is designed to accommodate both right and left hand brackets.



FIG. 8—Finished bracket. Welded construction is said to provide maximum strength with minimum weight, an important factor in this type of equipment.



Courtesy Aluminum Co. of America
Typical aluminum bearings of Alcoa 750 alloy.

Characteristics

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ALUMINUM-BASE bearing alloys with excellent bearing characteristics have been marketed and used in production during the past few years. Aluminum-manganese alloys containing lead and antimony or calcium have been used in Germany to replace white metal alloys. An aluminum alloy containing 5 pct Mg and 5 pct Zn with small additions of manganese, silicon, and sometimes lead, has been used in service. As a substitute for babbitts in automobiles, some European manufacturers used an alloy of

Characteristics and the application of the babbitts, the copper-lead group and the single phase metal bearings were discussed in the first part of this two-part article, published in THE IRON AGE, Sept. 5, 1946.

aluminum containing up to 20 pct Pb and some antimony. It is claimed that such an alloy has a tensile strength of 14,000 to 21,000 psi in the cast condition, and a tensile strength of 36,000 to 43,000 psi, with a Brinell hardness of 30 to 40, in the pressed condition. It is also reported that a bearing cast from this material will withstand a load of 7000 psi at speeds of 25 fpm with excellent results.

Three special aluminum-base alloys are used to some extent in Europe on automobiles, trucks and buses. These alloys are known as La 11, La 21 and La 31. Alloy La 11 contains small quantities of magnesium and zinc in aluminum. It is highly corrosion resistant, has good oil adsorption, and is relatively cheap. It can be used up to 212°F without heat treatment, and

up to 285°F with heat treatment. Alloy La 21 has hard silicon particles in a soft aluminum matrix, and contains about 6 pct Cu, and some silicon, nickel, magnesium and manganese, the remainder being aluminum. This is a high strength bearing alloy of low coefficient of thermal expansion, about equal to bronze, and of excellent performance characteristics. Its edge-pressure resistance is lower than that of the other two alloys. The temperature limits for this alloy are 200°F without heat treatment and 350°F with heat treatment. Alloy La 21 is suitable for vibratory loads

TABLE I
Mechanical Properties of European La Alloys¹

	Specific Gravity	Yield Strength, 0.2 Pct Offset psi (000 omitted)	Ultimate Strength, psi (000 omitted)	Elongation, Pct	Brinell Hardness
Cast Material					
La 11-NHT.....	2.7	19-34.8	44-56.8	4-12	35-45
La 11-HT*	2.7	47-63.2	56-76	1-4	60-85
La 21-NHT*	2.08	56-80	60-89	1-3	100-120
La 21-HT.....	2.08	80-98	86-98	0.5-3	120-150
La 31-NHT*	2.85	22-31.6	44-60	3-8	40-55
La 31-HT.....	2.85	47-70	60-76	0.5-3	65-80
Wrought Material:					
La 11-NHT.....	2.7	19-28	44-60	14-22	35-50
La 11-HT*	2.7	52-63	70-80	10-15	65-85
La 21-NHT.....	2.8	44-60	63-76	2-4	80-100
La 21-HT.....	2.8	92-107	108-120	0.2-1.5	130-150
La 31-NHT.....	2.85	28-41	50-63	6-12	45-60

* Qualities recommended. NHT = not heat treated. HT = heat treated.

of Aluminum Bearings • • •

Physical and operating characteristics of aluminum-base bearing alloys, both American and European types, are discussed from the application viewpoint. A comparison is made with other standard type bearing materials, and advantages and disadvantages of the various aluminum alloys for specific uses are discussed.

and operates well under conditions of marginal lubrication. It also can stand high temperatures in an emergency.

Alloy La 31 contains 8 pct Sn and Cu with additions of nickel and magnesium, the remainder being aluminum. This alloy is easily run-in, with good resistance to edge pressures, and has no undue tendency to seize even under reduced lubrication. All these alloys are medium hard and have good operating characteristics. Alloy La 31 is superior to La 11 but requires a general running-in, and its surface cannot be highly finished.

One European manufacturer of heavy trucks and buses has used Alloy La 31 on the main and connecting rod bearings in diesel engines for many years. Other firms have used it in auto engines of all types, especially for gudgeon pins and camshaft bearings. It has also been used on steam turbines. These alloys have proved satisfactory in the main spindle of lathes under very little clearance, in electric motors, rolling mills and grinding machinery. In fig. 1 is shown¹ the hardness of these aluminum bearing alloys in comparison with a tin-base white metal at temperatures up to 392°F. In table I are shown the mechanical properties of the aluminum "La" alloys.

It was found in all tests that using optimum surface finish for the bearings gave better running-in properties, and that the heat-treated alloys permitted higher limiting pressures than the unheat treated as-cast alloys. These aluminum-base bearing alloys are mainly employed as solid or split bushings.

Rolls-Royce cars are said to be fitted with aluminum-base alloys, called R.R.AC7 and R.R.AC9. The latter bearing material contains 5.5 to 7.0 pct Sn, 0.6 to 0.9 pct Cu, 1.5-1.8 pct Ni, 0.7 to 1.0 pct Mg, balance aluminum, and is used for big-end bearings and connecting rod bearings. The R.R.AC7 alloy is used for main bearings and the composition is 4.6 to 5.0 pct Sn, 1.6 to 2.0 pct Ni, 0.7 to 0.9 pct Mn, 0.4 to 0.8 pct Sb, 0.45 to 0.6 pct Si, 0.35 to 0.5 pct Mg, balance aluminum. For the aluminum-tin main bearings, shaft hardness of at least 600 Brinell is said to be required to prevent seizure, although big-end bearings have been successfully used with shaft hardness as low as 320 Brinell. The hardness of the bearings range from 42 to 100 Brinell at room temperature and from 36 to 90 Brinell at 300°F, according to specific composition. It is claimed that the frictional characteristics of these

Rolls-Royce bearings were better than the 70-30 Cu-Pb alloy under starved lubrication. They are used as solid bearings and not as linings. In operation the surface speeds must be low. It is stated that England has used the aluminum-base alloys in regular production as bearings for diesel engines, tractors and aircraft engines with very high loads.

Germany produced a group of alloys for aircraft engine bearings under the proprietary trade name of Alva. This group of alloys has varying composition, but two of the compositions are as follows: (1) 3 pct Pb, 3 pct Sb, 2 pct Cu, balance Al; and (2) 5 pct Pb, 8 pct Cu, 3 pct Fe, balance Al.

Another group of German alloys known as Quarzal, containing 15 pct Cu (max), 10 pct Si (max), plus manganese, iron, nickel, chromium, molybdenum, balance aluminum, showed favorable bearing properties. Quarzal Q2 contains about 2 pct Cu, while Quarzal Q5, Q8, Q12 and Q15 alloys contain 5 to 15 pct Cu and average hardness is approximately 125 Brinell.

An alloy known as KS280 containing 21 to 22 pct Si, 1.5 pct Cu, 1.5 pct Ni, 0.6 pct Mn, 0.5 pct Mg, 1.2 pct Co, balance aluminum, and of 120 Brinell hard-

FIG. 1—Relative hardness of various aluminum-base bearing alloys and tin-base white metal at varying temperatures.

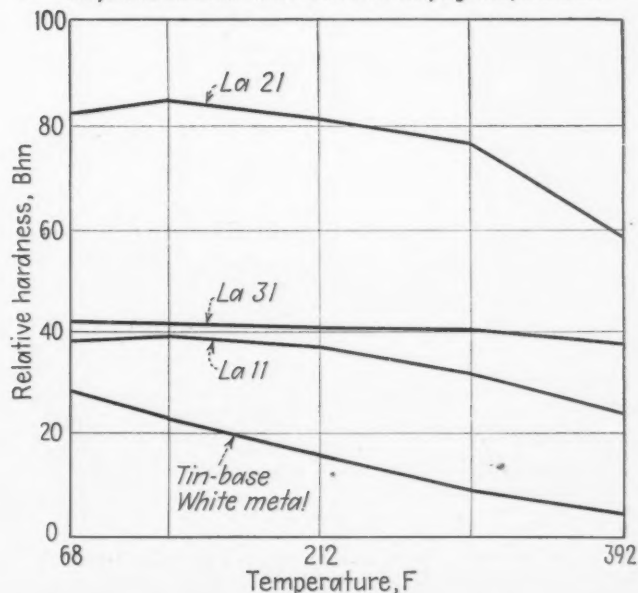


TABLE II
Properties of Alcoa 750 Bearing Alloy
(Stabilized Permanent Mold Casting)

	Room Temp.	200°F	300°F	400°F
Brinell Hardness.....	36.8	35.8	32.3	26.8
Tensile Strength.....	21,000	18,800	18,600	11,450
Yield Strength.....	10,500			
Shear Strength.....	13,750			
Elongation, Pct.....	10			
Density.....	2.88			
Charpy Impact.....	4.68			

Thermal Conductivity: 0.44 CGS units
Coefficient of Thermal Expansion
68-212°F 0.000131 per in./°F
68-392°F 0.000135 per in./°F

ness, has been used in Europe, particularly in Germany. Several of the minor alloys have been used to some extent in Europe, such as Chromet (10 pct Si, balance Al), Neomagnal A (Al-Mg-Zn), Alloy KSI3 (6 to 8 pct Sb, balance Al) and Alugir (3 pct Cu, 0.8 pct Zn, 1.15 pct Ni, balance Al). Two special Ger-

TABLE III
Typical Properties of Alcoa 750 Bearing Alloy Cast in a Permanent Mold

	Cast Heat Treated T533	Cast Heat Treated, Cold Worked 4¼ pct Reduction
Tensile Strength, psi.....	20,000	22,000
Yield Strength, (0.2 pct set), psi.....	8,500	16,000
Elongation, pct in 2 in.....	10	7
Yield Strength in Compression, 0.2 pct set psi.....	8,500	16,000
Brinell Hardness.....	35-50	40-55
Shear Strength, psi.....	14,000	.....

man alloys known as Junkers X (6 pct Fe, 0.5 pct Mg, balance Al) and Junker Z (6.5 pct Ni, 0.5 pct Ti, balance Al) have been used as camshaft bearings. Most of these German aluminum-base alloys were used in bearing applications involving relatively light loading, hardened journals, and efficient lubrication.

A recent development² in aluminum-base alloys is the

TABLE IV
Room Temperature Mechanical Properties of XA750 Bearing Alloy (Hollow Cylindrical Permanent Mold Castings)

	Cast Heat Treated (T7)	Cast Heat Treated (T7) Cold Worked 4¼ pct Reduction	
		Axial Reduction	Diametrical Reduction
Tensile strength, psi.....	22,000	23,000	23,000
Yield strength in tension, psi*.....	9,000	17,500**	15,000**
Elongation, pct in 2 in. gage length.....	10	7	7
Yield strength in compression, psi*.....	9,000	17,000**	20,000**
Brinell hardness.....	45	50	50
Rockwell hardness, H scale.....	75	90	90
Shear strength, psi.....	14,500	.....	.....
Endurance limit (500,000,000 cycles), psi.....	9,500	.....	.....

* 0.2 pct permanent set. ** In the tangential direction.

use of Alcoa 750 in high speed, heavily loaded automotive and aircraft engines. This alloy contains about 6 to 7 pct Sn by weight and the microstructure reveals small well dispersed globules of aluminum-tin eutectic of composition 99.5 pct Sn, 0.5 pct Al in the soft aluminum solid solution (1 pct Sn, 99 pct Al) matrix. The eutectic melts at 444°F. Some minor additions of copper and nickel are made to stabilize the alloy at high temperatures. This material is cast either in sand or permanent molds, and is given only a stabilizing heat treatment before use. The size, shape and distribution of the eutectic is altered significantly by variations in the solidification rate of the primary aluminum. It is claimed that this alloy has been used successfully at extremely high unit pressures and speeds and high oil temperatures. The high heat conductivity of the alloy is a particular advantage for its use in high speed, high output engines.

The advantages claimed for this alloy are long life, greater resistance to deformation and fatigue under severe conditions and superior resistance to corrosion in lubricating oils. The approximate test bar properties² of some stabilized permanent mold castings are given in table II. Typical properties, at room temperature and at elevated temperatures, of the 750 alloy, in the heat treated permanent mold cast and 4¼ pct cold worked condition as published by the Aluminum Co. of America, are shown in table III.

No substantial improvement in mechanical and physical properties results from solution and aging heat treatments, and the alloy is, therefore, supplied with a stabilizing treatment only (T533). The alloy can be cold-worked to improve its yield strength. This alloy has a high coefficient of expansion, and it is stated that no backing is necessary, but bearing thickness must be substantial.

Alcoa 750 alloy is recommended by the manufacturer for the main crankshaft and connecting rod inserts for truck, tractor, bus, diesel and aircraft engines. Bearings may be operated at rotative speeds up to 4000 rpm with hardened crankshafts and journal diameters of 2 to 3 in. This alloy has withstood long life tests at 4000 rpm under oscillating unit pressures of up to 5000 psi at temperatures up to 300°F. It is recommended to be used with highly polished hardened steel shafts. The recommended fit clearances are 0.001 to 0.0012 in. per in. of shaft diameter. The system must have satisfactory lubrication.

Claims made for bearing properties for this alloy are: (1) Comparable frictional characteristics with babbit or copper-lead alloys for normal service conditions, but poorer characteristics under severe loading where wiping or fatigue may occur; (2) equivalent scoring resistance to copper-lead alloys containing 15 to 20 pct Pb, superior to leaded bronzes, inferior to white metals; (3) superior fatigue resistance; (4) load carrying capacity is limited by the resistance to deformation and the frictional characteristics, but is greater than that of conventional bearing materials; (5) embeddability is inferior as hard particles of dirt do not embed as easily in the aluminum alloy as in the softer white metals; (6) alloy does not deform or conform as readily under high pressures and temperatures as do the softer metals, but does adapt itself to irregularities in fitting or shaft deflections within normal run-in periods; and (7) has higher corrosion resistance on exposure to the atmosphere or lubricating oils and their decomposition products at normal and high operating temperatures.

Aluminum-base alloys, characterized by a hetero-

geneous structure with a considerable portion of hard particles, operate at definitely higher loads with lower frictional characteristics and less wear than alloys having an equivalent matrix hardness but containing relatively small proportions of insoluble hard phases.

This Alcoa 750 alloy³ contains approximately 6.5 pct Sn, 1 pct Ni, 1 pct Cu, balance Al. It was found that by adding silicon to the aluminum-tin alloy effective improvement in resistance to scuffing was obtained. As a result the following alloy composition was patented: 6.5 pct Sn, 2.5 pct Si, 1 pct Cu, 0.5 pct Ni, remainder Al. This latter material retains all the superior characteristics of the Al-Sn-Cu-Ni alloy together with a distinct improvement in frictional and anti-seize properties. This aluminum bearing alloy with the silicon addition is now known as Alcoa XA750. Mechanical properties of the aluminum-tin-silicon-copper (XA750) bearing alloy, according to Hunsicker and Kempf², are shown in table IV.

The latest report from the Aluminum Co. of America is that the company has available as bearing materials one wrought and two cast aluminum alloys. All have proved themselves in use and in tests during the past years as very satisfactory bearing materials. The symbol of each alloy is 750 and XA750 for the cast, and XA80S for the wrought alloy. Alloy 750 with heat treatment T533, and alloy XA750 with heat treatment T7 are commonly furnished as permanent mold castings. Alloy XA80S is now available in flat sheets. The properties reported for XA80S alloy are shown in table V.

Light bearing alloys have excellent cold-working properties, a high capacity for oil absorption and good heat conductivity. Aluminum has three to four times the heat conductivity of steel and five times that of ordinary babbitt. Further, aluminum bearings do not have bonding planes which may act as barriers to heat transfer. The very rapid dissemination of heat in aluminum allows dissipation of local thermal risers

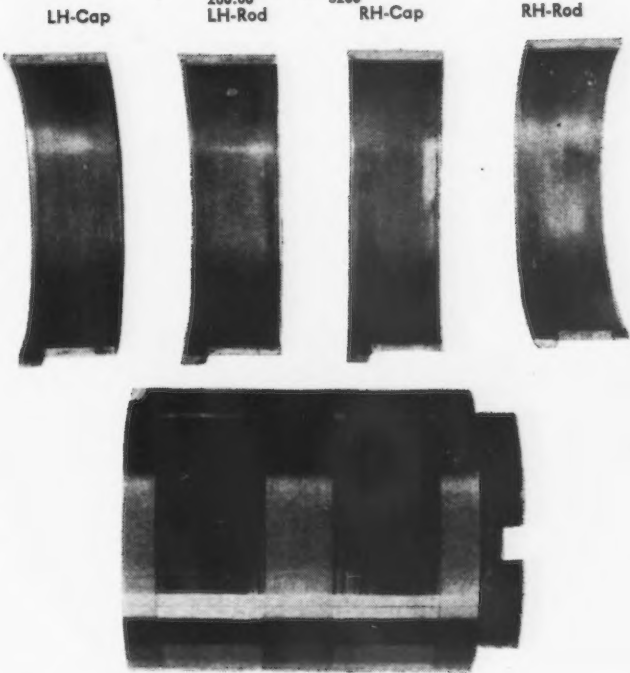
TABLE V
Properties of XA80S Bearing Alloy

	Annealed	3 pct Reduction	20 pct Reduction
Tensile strength, psi	21,000	21,000	25,000
Yield strength in tension, psi	8,000	15,000	23,000
Elongation, pct	25	15	8
Rockwell hardness, H scale	75	80	95
Specific gravity	2.83	2.83	2.83
Average coefficient of thermal expansion, per °F from 68° to 392°F	0.0000132	0.0000132	0.0000132
Thermal conductivity in CGS units	0.40	0.40	0.40

before damage can be done. The uniform structure of aluminum bearings is a great advantage when considering fatigue resistance and is superior to that of the babbitts or the copper-lead alloys because the bond is the usual point of fatigue failure.

Under conditions of interrupted oil flow and emergency running-in, copper-base alloys and tin-base babbitts are superior to aluminum alloys. Under dry friction tests aluminum alloys perform as well as the best copper-base alloys. However, it has been stated that aluminum alloys are best operated in the presence of oil, and that whenever they are permitted to run dry high temperatures coupled with deformation of the journal concentrate the stresses along a narrow edge

Rod Machine Test 63
Cast X750-T533 Alloy Reduced Width (0.75")
Test Bearing Inserts
6:00 hrs at 2150 R.P.M.
6:00 " " 2500 " "
10:00 " " 3000 " "
200:00 " " 3200 " "



Adapter Sleeve Test 63
Material: Am. Loco. Co. Crankshaft steel
(Brinell Hardness—140. Composition unknown)
Finish: Ground
Photograph shows high load side. Average wear in 222 hrs.—L. H. 0.0004", R. H. 0.00055".

FIG. 2—Cast 750 (T533) alloy bearings used in Rod machine test.

near the end surface and wear soon degenerates the bearing. If the alloys do break down in service, they will not affect the hard and polished steel journal as an easily removable film of aluminum is formed.

For certain applications, aluminum bearing alloys can run successfully on soft steel shafts. However, for extreme speeds and loads it is best to use a hardened steel shaft of 300 Bhn or higher. This property of longer life is more advantageous when conditions of high speed or heavy duty exist.

The general claims are that aluminum-base alloys

TABLE VI
Comparative Operating Characteristics of Various Bearing Alloys

Bearing Material	Alcoa X750	Tin-base Babbitt	Lead-base Babbitt	Cadmium-Silver	Copper-Lead
Composition	Sn-5.5-7.0 Al-bal.	Sn-89 Sb-7.5 Cu-3.5 Pb-0.25†	Pb-82-86 Sb-9-11 Sn-5-7 Cu-0.25†	Cd-98.75 Ag-0.75 Cu-0.50	Cu-60 Pb-40
Characteristics					
Maximum allowable operating pressure in lb/sq. in.	4,000	1,500	1,800	3,800	1,800
Minimum permissible ZN/P max value	3.50	15.0	10.0	3.75	3.75
Maximum allowable P max V value	150,000	42,500	40,000	90,000	90,000
Minimum Brinell hardness of journal	300	*	*	250	300
Maximum oil reservoir °F	275	235	225	260	260

* Not important. † Maximum.

have 1½ times the fatigue resistance of the copper-lead alloys and about six times the fatigue resistance of the tin-base babbitts. Its embeddability is about the same as the copper-lead alloys and a half to a third that of the lead-base alloys and tin-base alloys. Nevertheless, aluminum-base alloys are plastic enough to conform to any ordinary misalignment and to allow for good embeddability of dust particles which may be a source of scoring. Its corrosion resistance is equal to that of the lead and tin-base babbitts and much higher than the copper-lead alloys. Its resistance to scoring is about equal to that of the tin and lead-base alloys, if not inferior, and about equal to the silver bearings, but about double that of the copper-lead alloys and almost triple that of the cadmium-silver alloys.

Among the advantages claimed for the aluminum bearing alloys are: (1) Long bearing life; (2) high fatigue strength; (3) high resistance to corrosion; (4) high thermal conductivity; (5) ability to withstand high bearing pressures; (6) good conformability and embeddability, and (7) simplicity and economy in fabrication.

Bearings are used in varying types of machinery, under conditions so widely different that the properties required of a bearing material cover a very broad range. A good bearing alloy must be selected on the basis of a specific application. The selection of the proper bearing metal for a particular application requires knowledge of the physical, mechanical and metallurgical properties and characteristics of the material, the character of installation and the service conditions.

Some of the most important factors in appraising a specific bearing application are: (1) Type of load; (2) magnitude of shaft load; (3) speed; (4) bearing temperatures; (5) corrosive conditions; (6) lubrication and type of oil supply; (7) dirt conditions; (8) shaft hardness, and (9) speeds.

The Aluminum Co. of America has published the operating characteristics of various bearing alloys.¹ This tabulation, covering typical aluminum bearing alloy, a tin-base babbitt, a lead-base babbitt, a cadmium-silver alloy and a copper-lead bearing alloy, has unusual value to the design engineer in selecting the proper bearing material. These comparative data are given in table VI.

As a further aid in selecting the proper bearing material, table VII shows the relationship of the four

TABLE VII
Comparison of Functional Properties of Bearing Materials
(Copper-lead Base Characteristics = 10)

	Fatigue Resistance	Score Resistance	Embedda- bility	Corrosion Resistance
Copper-lead.....	10	10	10	10
Silver.....	30	20	5	30
Cadmium-silver.....	7	8	16	20
Lead-base babbitt.....	4	20	25	30
Tin-base babbitt.....	2	20	22	30
Aluminum.....	15	20	12	30

functional properties of bearing materials.⁴ Comparisons are made against copper-lead alloys which are given a merit rating of 10.

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Reflectoscope Checks Plate Quality for Welding

USE of the Sperry Reflectoscope¹ for checking the welding qualities of the edge of steel plate, as far as this is affected by segregations and inclusions, is reported by Babcock & Wilcox Co., Barberton, Ohio. O. R. Carpenter, welding engineer with Babcock, asserts that the instrument is capable of giving a qualitative indication of the concentration of segregations and inclusions along the welding edge. Existence of these defects in vessels under high pressure opens up zones of weakness and may lead to failure.

¹ The Sperry Reflectoscope, a supersonic inspection device, was described in detail in "Supersonic Testing in a Steel Plant," THE IRON AGE, Jan. 31, 1946, p. 38.

Use of the Reflectoscope for prewelding inspection was said to permit classification of plates over 1½ in.

thick as to whether or not they will cause trouble from inclusions and segregations after welding. Further investigations are being conducted with respect to plates under 1½ in. Babcock has found that a frequency of five megacycles is most satisfactory for this testing purpose. The photo shows the use of the Reflectoscope for checking the plate edge.



British Patent Magnesium Joining Process

USE of a metallic joining medium, not in the liquid state, for the joining or cladding of metals, particularly magnesium alloys, forms the subject of a recent British patent, according to the British journal *Light Metals*.

In the provisional patent reference is made to the fact that, ordinarily, no adhesion can be obtained for metallic coatings to magnesium due to the ease with which it oxidizes. The primary object of the new invention is to break down this oxide film by a mechanical process of abrasion, and it is stated that the basis of this is a consideration of the size of the abrading particles in relation to the thickness of the oxide film. The condition necessary is claimed to be satisfied if the surface of the magnesium in a preheated condition is rubbed by a pasty mass of alloy composition; for example, 1 part zinc, 4 parts cadmium, or 17 parts zinc, 134 parts cadmium. The abrading element is thought to be the actual metal crystals, and there is a temperature range of about 35°F in which the material is in the right pasty condition for use. It is indicated that other metals and alloys may be employed, but cadmium alloys are preferred, and that coatings can be applied with ease. Temperature control is important, but no cleaning of the surface is necessary.

Penetration Into Base

It is stated that the coatings do not penetrate into the magnesium, but there is a sharp line of demarcation which persists, even after annealing, in a reducing temperature, at all temperatures below a certain critical value. In the case of zinc-cadmium coatings, this temperature is that for the reduction of zinc oxide. Above this temperature, penetration occurs by diffusion between the crystals of the magnesium, and a coating of 0.002 in. may show penetration to the extent of 0.01 in.

In the body of the final specification, it is stated that an inter-layer of zinc plus cadmium, or bismuth plus cadmium, has proved excellent. The mixture must produce small crystals at a certain temperature, and it is suggested that these small crystals must be of a certain hardness and, perhaps, shape. Further, they must be surrounded by, and wet with, molten metal. The mechanical work is preferably carried out while the temperature of the assembly is falling.

The inter-layer may be an alloy; for example, 1 part zinc and 4 cadmium, or 4 zinc and 1 cadmium, or alloys in between these proportions. Or again, it may be layers of the two metals superimposed, providing such layers can be reduced to a pasty mass of solid particles and liquid, at a temperature less than that required for the softening of the two metals that are to be joined. With cadmium and zinc, a composition on either side of the eutectic alloy can be selected.

An example is given of the covering of magnesium alloy with aluminum, nickel or other metal. The covering sheets are degreased, and then coated with cadmium electrolytically on both sides by plating for 20 sec at 10 amp per sq ft. This is stated to give a thickness of cadmium of 0.0005 in. per hr. The sheets then pass to an electro-zinc plating solution, and zinc de-

posited for 40 sec, at 10 amp per sq ft. They are then passed to a cadmium bath and further plated with cadmium for 20 sec.

The magnesium-rich alloy may consist of a plate $\frac{3}{4}$ -in. thick, and the covering plates of aluminum or of nickel may be 5 pct of this thickness. They are assembled as a sandwich between heavy steel slabs, and placed in a muffle furnace to attain a temperature of 620°F. The adhesion temperature for the zinc-cadmium coating is that for the optimum pasty condition, and is 18° to 27°F at temperatures between the melting point of the pure metal and of the eutectic, depending upon the composition of the alloy. The sandwich is heated well above this temperature, and cooled down to a temperature which ensures that it passes through the optimum pasty condition, during which period the coating is subjected to mechanical working. After leaving the muffle furnace it is passed between rolls, preheated to about 285°F. The example suggests 2 ft in diam, with a peripheral speed of about 120 fpm. Pressure is exerted to produce an elongation of 10 pct at the first pass, when the plates will adhere together.

Annealing Procedure

After this pass the sheets may be annealed. If the temperature is raised to 750°F for over 5 min, a layer containing hard constituents is said to form at the junction, following a mutual diffusion of the magnesium and aluminum. It is preferred to avoid the production of these hard constituents, and that the annealing temperature should be kept just below 750°F with the time cut down to a minimum. The layer of hard constituents is not entirely avoided, and its thickness is reduced by subsequent rolling.

The inter-layer may be raised to 750°F above its melting point without apparent fusion and with partial oxidation of the inter-layer occurring during heating. These oxides are important in obstructing mutual diffusion of two dissimilar metals. The consequent limitation to the formation of the layer containing hard constituents enables higher temperatures to be used for the annealing.

Subsequently the sandwich is again subjected to rolling; this time at a higher temperature, say 500°F, with a 10 pct elongation at each pass. This continues until the desired thickness, for example, 1/16 or 1/20 in. is obtained, the final roll being performed with cold rolls. The adhesion may be improved by heating the composite sheet for 4 hr at about 210°F. Despite the formation of a brittle constituent at one stage of the process, the finished coated sheet behaves, it is claimed, as a ductile material.

The inter-layer coating may be applied to the material to be coated, not necessarily to the covering sheet. Again, the covering material may not necessarily be sheet, but it can be applied to the inter-laying material as a spray metal coating, and then its outer surface can be burnished.

The edges of the sheet or article can be protected by using a covering sheet of greater width than the article, and bending the edges of the covering body over to protect those of the article.

Surface Finishes For Aluminum

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Methods of applying a wide variety of metals to aluminum and its alloys by electroplating are described herein. Composition of the plating baths, times and temperatures are given, together with pertinent information on cleaning, pretreatment and posttreatment.

• • •

ALUMINUM and its alloys may be electroplated satisfactorily, by means of the solutions and methods ordinarily employed for electroplating other metals. These coatings are applied for the decorative effects achieved and for other specific reasons; for example, chrome coats are both decorative and abrasion resistant, and zinc and cadmium coats are applied as bases for other plates and to protect aluminum under certain corrosive conditions.

The first two sections of this three part series, based on a book by the same author and shortly to be published by Reynolds Metals, Inc., dealt with chemical treatments and electrolytic oxide formation, and appeared in the Aug. 29 and Sept. 5 issues.

In like manner, silver is applied to aluminum to improve electrical contact, as well as to act in an ornamental capacity. Copper, brass and nickel are also applied for appearance, as well as to act, in certain cases, as bases for other plates applied subsequently.

GENERAL PLATING PROCEDURE—The procedures used for plating various metals on aluminum and its alloys are equivalent to the methods used in general commercial practice. The basic equipment is the same, but minor variations in technique, solution concentration, etc., are necessary to achieve satisfactory results. The range of these variables is given in the following paragraphs, in general, but other minor controls may be necessary in production to obtain the quality plate desired on the metal.

In plating on aluminum and its alloys, the initial preparation of the metal surface is very important. The surface must be buffed smooth to eliminate any scratches or unevenness, and then cleaned in a hot, mild alkaline cleaner to free the metal of any dirt, grease and buffing compounds present. After this step, the work is rinsed thoroughly in clear, cold water.

After cleaning, the parts may be immersed for 2 min in a zincate solution, as described under chemi-

cal treatments, to impart a very thin coating of pure zinc on the metal surface. This treatment removes the hard aluminum oxide which naturally occurs on aluminum and its alloys, and bonds the zinc directly to the unoxidized aluminum. The adhesion thus obtained is excellent.

After zinc coating, the work is immersed in a specific plating solution and the desired metal electrodeposited. If successive plates are required, they may be applied over each other provided the necessary precautions of buffing, electrocleaning and pickling are taken between each plating operation. After plating, the work is buffed to the luster desired.

In plating other metals on aluminum and its alloys, care should be taken to insure that precleaning and the rinsing after each solution treatment are very thorough. Porous plates or blisters will result if these precautions are not taken, since the various baths used will be contaminated by carryover from the preceding tanks. The nature of the water supply is a factor to be considered in some areas since hard waters may leave an insoluble residue on the metal. Running water is more desirable in the rinse tanks since it prevents the contamination which usually occurs in still tanks.

COPPER PLATING—Copper may be plated on aluminum and its alloys after anodizing in phosphoric acid. The work is made the cathode in a Unichrome copper plating solution which is made as follows:

Unichrome copper salt

No. C-10 56 oz per gal of water

Ammonium hydroxide 0.06 gal per gal of water

Salt No. C-10 is added to a tank two thirds full of water and stirred until dissolved. The temperature is then raised to 120° to 140°F and the solution is filtered clear. After this, the ammonium hydroxide is added, and the pH is adjusted to 8.5 by careful additions of Unichrome No. 4A salt to lower the pH or of ammonium hydroxide to raise the pH.

The work is plated in the copper solution maintained at a temperature of 135° to 140°F. The voltage is 2 to 6 v dc and the current density is 30 to 50 amp per sq ft. After plating, the work is rinsed thoroughly in water. The thickness of plating varies from 0.0005 to 0.001 in. depending on the time in the solution.

Copper may also be plated on aluminum and its alloys by first precleaning and zincating the metal. After this pretreatment, the parts are immersed in a cyanide copper plating solution, maintained at 80° to 95°F. A direct current potential of 1.5 to 3 v is applied at a current density of 3 to 15 amp per sq ft.

The thickness of the copper plate varies from 0.0005 in. for a color coat to 0.002 in. for a buffing coat, depending on the immersion time.

The copper solution is made in the following proportions: copper cyanide 3 oz, sodium cyanide 4.5 oz, sodium carbonate 2 oz to 1 gal of water.

Copper plates on aluminum are generally used where soldering operations are required, for certain electrical requirements and for decorative items.

BRASS PLATING—Brass may be plated on aluminum and its alloys by first precleaning and zincating the metal surface. After this, the work is immersed in a brass plating solution, maintained at 80° to 95°F, at a voltage of 2 to 3 v dc and a current density of 3 to 5 amp per sq ft. The brass solution is made in the following proportions: copper cyanide 4 oz, zinc cyanide 1.25 oz, sodium cyanide 7.5 oz, sodium carbonate 4 oz to 1 gal of water. One pt of ammonium hydroxide should be added to each 100 gal of solution.

The thickness of the brass plate varies from 0.0005 in. for a color coat to 0.002 in. for a buffing coat, depending on immersion time. However, the color of the deposit can be changed from a deep bronze to a light yellow by (1) increasing the free cyanide, (2) increasing the current density or (3) decreasing the temperature. Therefore, if a uniform color is required, all conditions must be held within close limits. Brass plates on aluminum are used for applications similar to those for copper plating on aluminum.

NICKEL PLATING—Nickel plates on aluminum and its alloys are generally applied after precleaning and anodizing in an oxalic or phosphoric acid electrolyte. Nickel plate may be applied on zincate,

if desired. The solution temperature is maintained at 75° to 85°F for the dull white nickel solution formulated as follows: single nickel salts 16 oz, ammonium chloride 3 oz, and boric acid 4 oz to 1 gal of water. The voltage is 4 to 6 v dc, and the current density is 5 to 15 amp per sq ft.

The warm type of nickel solution requires a maintained temperature of 120° to 160°F, a voltage of 4 to 6 v dc, and a current density of 20 to 40 amp per sq ft. This solution is formulated as follows: single nickel salts 30 to 40 oz, nickel chloride 7 to 8 oz, and boric acid 5 oz to 1 gal of water. The thickness of the plating should be from 0.00025 in. for a color coat to 0.001 in. for a buffing coat. The service required of the part has a direct bearing on the plating thickness deposited. In general, heavier coats possess better corrosion resistance.

BLACK NICKEL PLATING—A black nickel plate on aluminum and its alloys may be obtained after cleaning the preplated metal and dipping it in a 3 pct sulfuric acid solution for 15 to 30 sec. Following this treatment, the aluminum is plated in a nicked plating solution of the following composition: single nickel salts 10 oz, double nickel salts 6 oz, zinc sulfate crystals 5 oz, and sodium thio-cyanate 2 oz to 1 gal of water. The work is immersed in the bath, maintained at 80° to 90°F, for 20 to 40 min. The voltage is 4 to 6 v dc at a current density of 0.5 to 1.5 amp per sq ft. The pH of the solution is maintained at 5.8 to 6.1 and sulfuric acid is added to the bath to keep it within these limits.

This type of plating is generally used as a background on such items as nameplates. It is a decorative finish and possesses only fair exposure resistance.

CHROMIUM PLATING—Aluminum and its alloys

ECONOMICAL mass production of aluminum kitchenware requires mechanical handling facilities at every possible point. Here a flat belt conveyor carries fry pans from a washing machine through a drying tunnel.



are readily plated with chromium either after zincating, or after anodizing in oxalic acid, and copper, brass or nickel plating. Lustrous chrome plate is obtained by plating it over buffed copper, brass or nickel plates and then buffing it to the polish desired. Chromium plates are generally applied for the decorative effect obtained and for resistance to abrasion.

The following procedure may be used for chromium plating on aluminum and its alloys. The work is first cleaned and then immersed in a zincate solution, or anodized and preplated as noted above. After this, the parts are immersed in the chromium plating solution formulated as follows: chromic acid 53 oz and sulfuric acid 0.5 oz to 1 gal of water. The bath is maintained at $122^{\circ}\text{F} \pm 2^{\circ}$ and the plating is accomplished at 6 to 8 v dc with a current density of 200 to 225 amp per sq ft. The plating thickness varies from 0.00002 in. for decorative purposes to 0.0005 in. or thicker for wear resistance. This plating solution is patented by the United Chromium Co.

TIN PLATING—Tin may be plated directly on aluminum and its alloys by the following method or it may be deposited over a zincate coating. The work is immersed in a tin plating solution, maintained at 150° to 170°F and formulated as follows: sodium stannate 16 oz, sodium hydroxide 1 oz, sodium acetate 2 oz, and 100 vol hydrogen peroxide or sodium perborate 1/16 oz to 1 gal of water. The parts are plated at 4 to 6 v dc at a current density of 30 to 50 amp per sq ft. The thickness of plating should be about 0.0007 to 0.001 in. for satisfactory performance. Tin plates on aluminum are used principally for joining the metal by soldering.

ZINC PLATING—Zinc may be plated on aluminum and its alloys from zinc cyanide solutions. The work is first precleaned and immersed in a zincate solution for 2 min. Then, after rinsing, the parts are immersed in a cyanide zinc plating solution maintained at 105° to 120°F and formulated as follows: zinc cyanide 8 oz, sodium cyanide 3 oz, and caustic soda 7 oz to 1 gal of water. The voltage is about 4 to 6 v dc with a current density of 10 to 20 amp per sq ft. The thickness of coating should be about 0.0005 in.

Zinc is anodic to aluminum and its alloys and, therefore, offers protection to the base metal under certain corrosive conditions.

CADMIUM PLATING—Aluminum and its alloys may be plated with cadmium from a plating solution formulated as follows: cadmium oxide 3.5 oz and sodium cyanide 14.5 oz to 1 gal of water. A brightener is added as required. The work is first pre-cleaned, dipped in a 3 to 5 pct sodium hydroxide (180°F) solution for 15 to 30 sec, and then rinsed. Then zincate and flash plate with brass or copper. After this treatment, the parts are immersed in the cadmium plating solution, maintained at 70° to 95°F , until a coating of 0.0005 in. in thickness is deposited. The voltage is 1 to 4 v dc with a current density of 15 to 45 amp per sq ft. Cadmium ball anodes are generally used in the tank.

Cadmium plates are almost neutral to aluminum and its alloys, and therefore, these coatings offer corrosion protection to the base metal under certain conditions of exposure.

SILVER PLATING—The plating of silver on aluminum and its alloys is accomplished by first pre-cleaning and zincating the metal. After this, or

after preliminary plates, the parts are immersed in a silver strike solution made in accordance with the following formula: 5 to 7 oz of silver cyanide and 8 to 10 oz of sodium cyanide to 1 gal of water. This solution is maintained at room temperature, and 1.5 to 3 v dc at a current density of 15 to 25 amp per sq ft are applied for 2 to 3 min. The work is then removed from the strike solution and plated at 6 v dc at a current density of 5 to 15 amp per sq ft in a silver plating solution maintained at 74° to 78°F . The silver plating solution is made in the following proportions: silver cyanide 4 oz, sodium cyanide 4 oz, and sodium carbonate 6 oz to 1 gal of water. The thickness of the silver coating is usually specified by the weight of silver deposited, and not in thousandths of an inch, as are other metals. The work should be thoroughly rinsed after silver plating.

Silver plating on aluminum is used for decorative items, jewelry and electrical contacts.

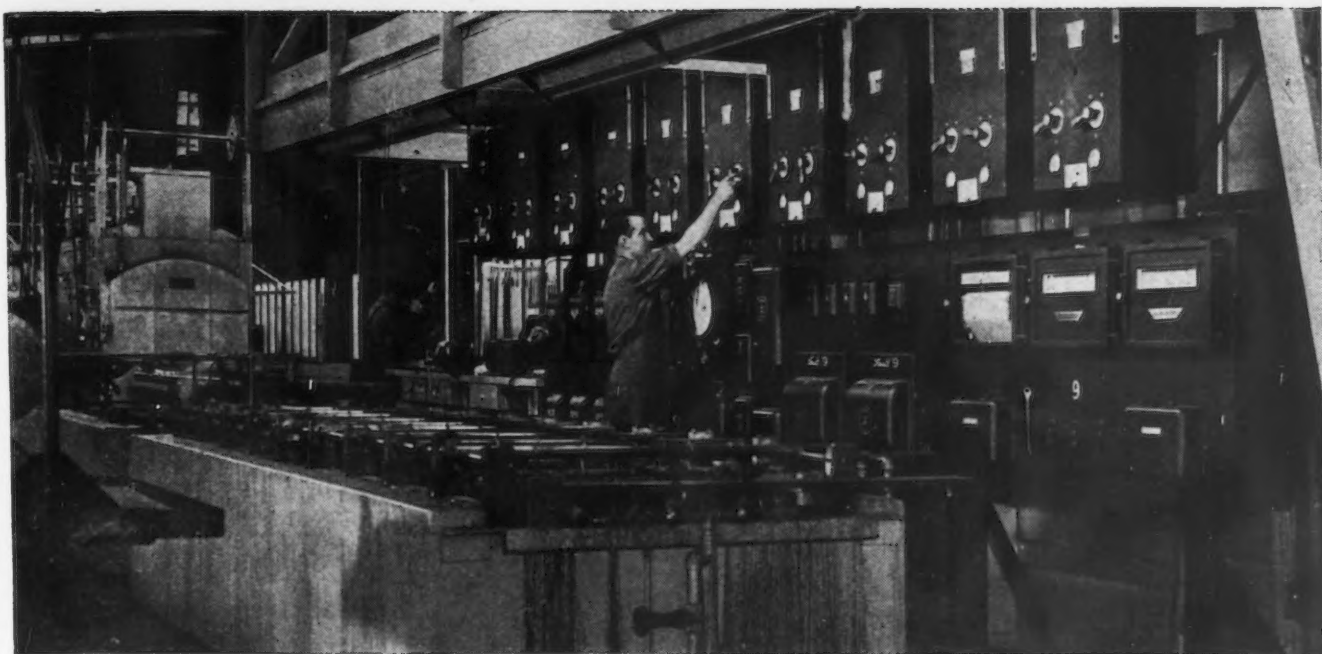
GOLD PLATING—The plating of gold on aluminum and its alloys is accomplished by first pre-cleaning and zincating the metal as is done prior to silver plating. After this, or after preliminary plates, the work is plated for 2 to 3 min from a gold cyanide solution maintained at a temperature of 158°F . The voltage is 1.5 to 2 v dc at a current density of 2 to 10 amp per sq ft. This gives a deposition of 7.36 g of gold per amp-hr. Stainless steel or gold anodes are used in a potassium gold cyanide solution made in the following proportions: 1.5 to 3.0 oz of 41 pct potassium gold cyanide, 1.3 to 2.6 oz potassium cyanide, 2.6 oz potassium hydroxide, and 1.302 oz potassium sulfite to 1 gal of water. In thin coats, the color of the gold deposited is changed in accordance with the underlying plates applied; for example, if the preliminary plate is nickel, the gold plate will be light in color; if the preliminary plate is brass, the gold will be a medium gold color; and if the preliminary plate is copper, the gold plate will be a dark red color. Gold plating is usually applied in a very thin coating for costume jewelry, but it may be applied to any desired weight.

POROUS PLATE ON ALUMINUM—Porous chrome plate may be obtained on aluminum and its alloys by various means. This type of plate is deposited because of its superior wear resistant characteristics and because of its ability to retain a lubricant when used as a bearing surface.

A method commonly used is to etch an initial hard chrome plate deposited on the aluminum by means of an immersion in dilute hydrochloric acid or sulfuric acid, or a short reversal of the current in a chrome plating bath. After etching, the plate is honed or otherwise smoothed to level off the peaks produced. The dirt and detritus remaining in the valleys or pits are removed by washing the parts with a hot, mild alkaline cleaner under high pressure, similar to sandblasting. This effectively removes any dirt or particles from the pores.

Another method used to obtain a porous chrome plate on aluminum is to deposit the chrome over a roughened or etched surface. A coating thickness of 0.001 in. or thicker is required to obtain satisfactory results, since the plate deposited must be smoothed by honing or lapping. A combination of mechanical roughening and chemical etching after plating may be used if desired.

SPECIAL PLATES ON ALUMINUM—Several of



ELECTROPLATING on aluminum requires careful control of time, temperature, and electric current. This well-engineered panel board was set up in the Curtiss-Wright plant at Columbus.

the rare metals, such as indium, platinum, palladium and rhodium may be plated on aluminum. The work is precleaned and then nickel plated and preplated with other metals, as required, before the above plates are deposited.

Indium is deposited from a fluoborate bath composed of indium fluoborate 31.5 oz, boric acid 3.5 oz, and ammonium fluoborate 6 oz to 1 gal of water. The bath is maintained at 80°F and the current density is about 75 amp per sq ft.

Platinum is deposited from a nitrate solution as follows: ammonium nitrate 100 g, sodium nitrate 10 g, platinum P-salt 10 g, and ammonia 50 cc to 1 liter of water. The bath is maintained at about 200°F and the voltage is 25 v dc at a current density of 55 amp per sq ft.

Palladium is deposited from a sodium palladium nitrate bath of the following composition: sodium palladium nitrate 1 pct, sodium nitrate 1 pct and sodium chloride 5 pct. The bath is maintained at about 110°F and the voltage is 1.2 v dc at a current density of 10 amp per sq ft.

The rhodium bath is usually formulated as follows: conc sulfuric acid 20 cc and conc rhodium solution 2 g to 1 liter of water. The temperature of the bath is about 110°F and the voltage is about 3 to 5 v with a current density of 20 to 70 amp per sq ft.

Some of the plating solutions discussed in this article are patented and may be used only under a license agreement.

Purification of Rhodium Plating Baths

A METHOD of purifying rhodium plating solution involving precipitation of certain metallic impurities with potassium ferrocyanide was described in a paper presented by A. Brenner and W. A. Olson, National Bureau of Standards, Washington, at the 1946 annual meeting of the American Electroplater's Society in Pittsburgh. The authors stated that some rhodium plating solutions which were used in a government establishment began to yield dull deposits after a period of operation. The help of the bureau was requested, and samples of the plating baths were submitted to the platinum metals section for examination. It was found that zinc was the impurity responsible for the lowering of the reflectivity of the rhodium electrodeposit.

Rhodium plating solutions become contaminated rather readily, according to the authors, because the acid solution rapidly attacks materials accidentally introduced into the bath. Contamination by small amounts of impurities is first noticeable by a decrease in the reflectivity of the deposit. Larger

amounts of impurities will cause a visible darkening of the deposits, which, in severe cases of contamination, may become almost black.

A simple method of purification¹ can be applied in

¹ For protection of Government rights, a patent has been applied for.

a plating shop and does not involve much expenditure of time or money. It is based on the precipitation of most of the metallic impurities, such as zinc, iron, cadmium, nickel, cobalt, silver, mercury and lead, in the acid rhodium solution by potassium ferrocyanide. Under these conditions rhodium remains in solution. Copper is not completely precipitated by this treatment because its ferrocyanide is soluble in mineral acids.

The amount of potassium ferrocyanide required for purifying the bath is determined by titrating a 250-ml portion with potassium ferrocyanide solution, containing about 20 g of $K_4Fe(CN)_6 \cdot 3H_2O$ per liter. From the results of the titration, the amount of potassium ferrocyanide which must be added to the main bath may be calculated.

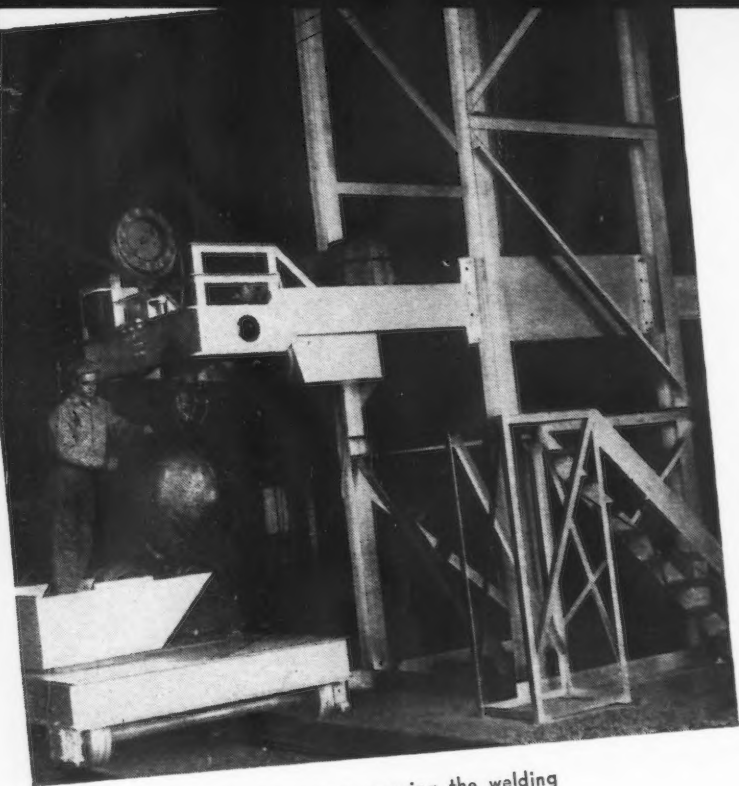


FIG. 1—Use of this gantry carrying the welding unit, and a carriage providing longitudinal or rotary movement of the work, has increased production six times over former manual welding methods.

BUILT to provide assembly line production of butane and propane tanks by means of the Lincolnweld process of automatic arc welding, the specially designed gantry and carriage shown in fig. 1 has not only resulted in the fabrication of a superior product but has increased production

Gantry Aids Welded Tanks

volume by six times the rate of the former all hand-welded method used, according to Creamer & Dunlap, Tulsa, Oklahoma.

In addition to manufacturing tanks for the oil, chemical and allied industries, the company fabricates 500 to 2000 gal propane tanks for fuel storage in homes located where piped gas is not available.

The company's Lincolnweld unit is mounted on the gantry, and the work is moved into any required position on the carriage by means of special machinery which moves the tank horizontally for longitudinal welds and revolves it for circumferential welds.

The process by which the tanks are welded embodies a combination of manual and automatic techniques on the exteriors and manual welds of the interiors. On the $\frac{7}{8}$ to 1-in. plates, the circumferential welds are made with a manual sealing bead which is deposited in the V joint and penetrates into a backup strip which ranges in width from $\frac{1}{8}$ to $\frac{1}{4}$ in. max. Amperage used ranges from 175 to 200 with from 34 to 36 v. Automatic welds are then overlapped in three passes at from 800 to 1000 amp, with current from 32 to 38 v, as shown in fig. 2 (a). A speed of from 9 to 15 ipm is attained, using a $\frac{1}{4}$ -in. mild steel electrode. The longitudinal weld on the $\frac{7}{8}$ to 1-in. plate is made with two manual overlay beads which are deposited from the interior side of the tank to a penetration of from $\frac{3}{16}$ to $\frac{1}{4}$ -in. These are applied at amperage rang-

FIG. 2—On $\frac{7}{8}$ to 1-in. plate, head and shell welds are made as shown at (a); longitudinal and circumferential welds are made as shown at (b).

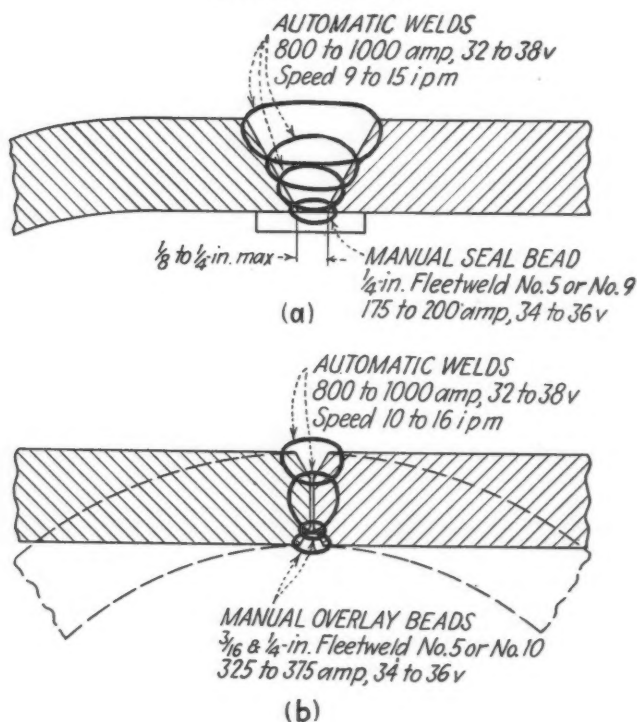
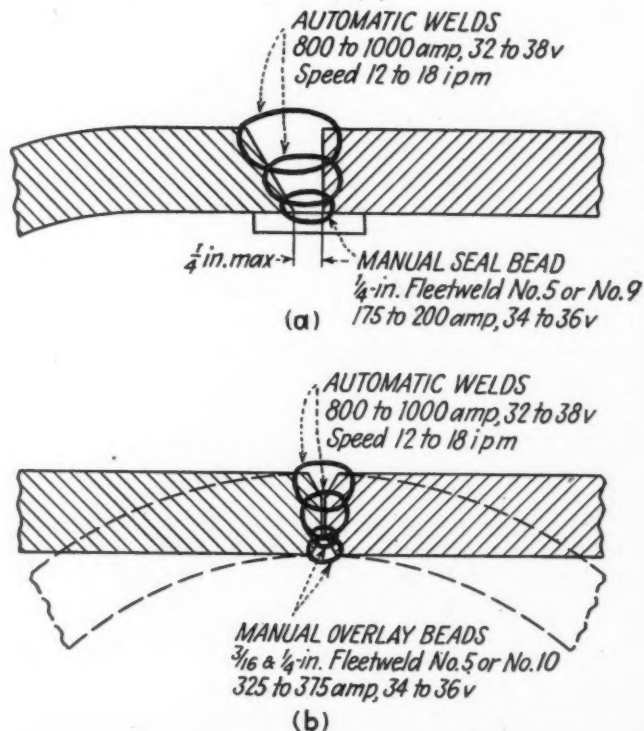


FIG. 3—On $\frac{3}{4}$ -in. plate, head and shell welds are made as shown at (a); longitudinal and circumferential welds are shown at (b).



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ing from 325 to 375 with power between 34 to 36 v. Automatic welds are then applied over this base at from 800 to 1000 amp and from 32 to 38 v at a speed of from 10 to 16 ipm as shown in fig. 2 (b).

On the 3/4-in. plate the circumferential welds are also made with a manual sealing bead, but this one is deposited in a semi-v joint to a maximum penetration of 1/4 in. and at from 175 to 200 amp and from 34 to 36 v. The longitudinal weld on this plate is exactly the same as on the 7/8 to 1-in. plate except that the automatic welds which take two passes attain a speed of from 12 to 18 ipm. See fig. 3 (a & b). 1/4-in. mild steel electrodes are also used for this weld.

On 1/2-in. plates, the circumferential weld is started with a manual seal bead in exactly the same manner as on the thicker sheets but the automatic welds are applied in two passes in a semi-v joint at from 750 to 900 amp and from 32 to 38 v and at a speed of from 22 to 28 ipm, as indicated in fig. 4.

The techniques vary on the 3/16 to 1/4-in. plates in that the joint is square for the circumferential weld and a single manually applied sealing bead is deposited with 3/16 or 7/32-in. mild steel electrode to a maximum penetration of 1/4 in. A single pass automatic weld is then applied at from 500 to 700 amp and 32 to 38 v, attaining a speed of from 32 to 38 ipm. See fig. 5. There is also only a single pass manual seal bead on the longitudinal weld applied with a 1/4-in. mild steel electrode from the interior and an automatic weld applied from the exterior

Use of a specially designed gantry carrying an automatic arc welding unit to weld seams and heads of butane and propane tanks is described. Types of electrodes used, amperage, voltage and location of manual sealing beads are also covered.

with 500 to 700 amp and 32 to 38 v but attaining a speed of from 32 to 38 ipm. In these operations, the loose flux drops into a container where it is picked up by means of a vacuum cleaner and reused.

The vessels, when completed, are subjected to hydrostatic tests of twice their working pressure. Fig. 6, an automatic circumferential weld and part of a longitudinal weld, illustrates the smoothness of the welds obtained by the automatic process.



FIG. 6—The smoothness of this weld, produced automatically, adds substantially to the appearance of the finished job.

FIG. 4—Except for higher welding speeds, the technique for welding 1/2-in. plate is similar to that used on 3/4-in., but the outside V is omitted on the circumferential weld.

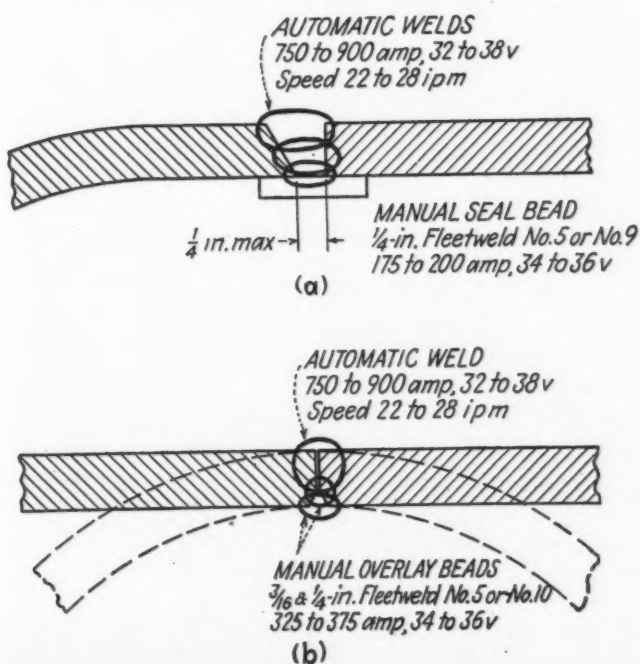
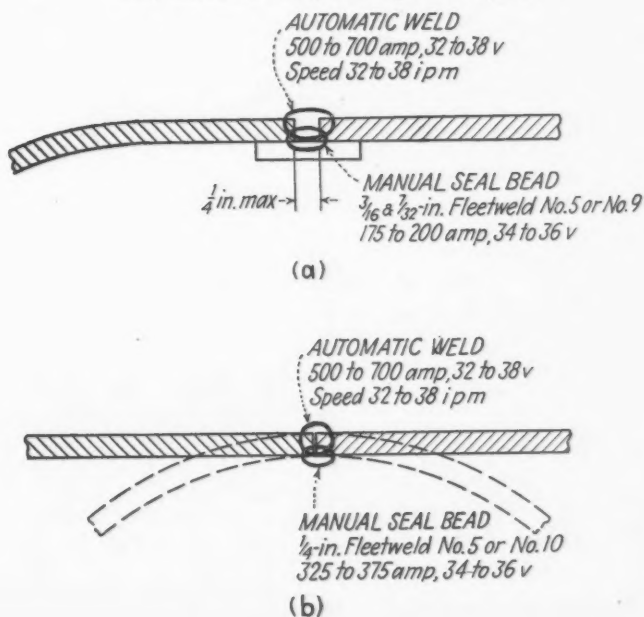


FIG. 5—On 3/16 to 1/4-in. plate welding speed is substantially increased and plate edges are square.



USSR Steel Industry

A delegation of the British Iron & Steel Trade Confederation, consisting of Harold Davey, George Lynch, Emlyn Roberts and Jake Williams, members of the executive council of the union, Harry Douglass and Thomas Meehan, divisional officers, and Lincoln Evans, assistant general secretary, visited the Soviet Union at the invitation of the Iron & Steel Workers' Union of the USSR. Upon completion of the trip, the British delegation prepared an official report. The following article is an extended abstract of this official report.

In the foreword to their report, Lincoln Evans writes: "There were no strings to it; the delegation were simply invited to come and see things for themselves. The invitation sprang primarily from the proposals of the Anglo-Soviet Trade Union Committee, which recommended the exchange of delegations between similar trade unions in each country.

"The report makes no claim to be a thorough examination of conditions prevailing in the Soviet Union. To do this would have required far more time

than the 28 days the delegation spent there. In that time the number of places that could be visited was obviously limited, having regard to the difficult traveling conditions, etc., and the size of the country to be covered.

"We have not looked at things through the eyes of our Soviet friends; there would not be any purpose in our visit if we had done so. Nevertheless, we have tried to be fair and objective—no easy task in reporting about a country whose achievements have been the subject of controversy in which one is expected to take sides.

"We were freely allowed to take what notes we cared, and there were no obstacles put in our way of gathering information other than those imposed by time and space. We left the USSR with many warm recollections of the courtesy and kindness of our hosts, who often under difficult conditions left nothing undone to make our stay an interesting and pleasant one."

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THE USSR is so vast that it is the easiest thing in the world for a visitor to lose his sense of proportion. This is why so many come back with glowing and exaggerated accounts of its achievements, while others concentrating on the seamy side of things report how irretrievably bad everything is. This difference in approach is largely a matter of temperament, and is bound to exist in every delegation, including our own. Nevertheless, there was common agreement among us that it was not our business, even if it were possible, to compile a report which set out to prove whether the system prevailing in Russia was a success or otherwise, but to record as truthfully as we could, and try to give our members a picture of things as they appeared to us, without stressing what we did not like or being extravagant in praise of what there was to admire.

The main purpose of our visit was, of course, to see as much of the iron and steel industry of the USSR as we could in the time allowed, and to obtain such information regarding the practice and conditions in the industry as would be of interest to our members. Nevertheless, we saw many other phases of Russian life, and if we refrained from giving our impression of what we saw of these, this report would lose a great deal of its interest.

The first steel works visited was the Electro Steel, which was reached after a journey of some 30 miles by road from Moscow, during which our greatest anxiety was whether or not we should be pitchforked through the roof of the car owing to the condition of the road. This calamity averted; we went around the plant, after being hospitably received by the chief director and staff.

It contained six electric furnaces of 6-net tons capacity erected in 1916, which had a total output of 112-net tons in 24 hr. It was similar in all respects to electric

furnace plants of the same age in this country, and while we were able to ascertain that four men worked on each furnace, it would be difficult to assess the number engaged in the pit where uphill teeming with hot tops was in progress.

The only mill in the plant was an old-fashioned 18-in. 3-high hand-rolling type. Special steels were rolled into bars and rounds. We were surprised to be told that there were 6000 people employed, because, judging by the number of furnaces and mills, we would have considered that two thirds the number of workers would be required on a comparable British plant.

Magnitogorsk—Soviet Eastern Star

No plant has been more written about than the one at Magnitogorsk. It consists of eight batteries of coke ovens, six blast furnaces, twenty-one openhearth furnaces, two blooming and slabbing mills, three continuous tandem mills, two mechanized plate and sheet mills, five section mills, and two nut and bolt factories. They also have very large foundries, cupola shop with electric furnace, pressing shop, machine and mold shops, and also their own farms. The plant employs 35,000 workpeople.

A mountain of ore dominates the landscape. Tier after tier, each 30 ft high, of ore levels being worked were visible from some considerable distance. Fifty pct of the material was blasted and scooped up by mechanical shovels ready for use in the blast furnaces immediately. The remaining 50 pct has to be washed free from clay, some of it passing through an excellent Dwight Lloyd sintering plant.

An extremely efficient concentration mill crushes, grades and washes the ore, which is then taken to bunkers by conveyor-belt systems. Each one of the three Krupps Crushers is capable of dealing with 16,800 net tons in 24 hr, and, simultaneously with

crushing, grades the material into the various sizes, the final residue of which is sent to the sintering plant before mentioned. Sixty pct of the employees here were women.

Eighty-ton tipping wagons convey the ore to the blast furnaces, of which there are six in commission, two yielding 1680 tons each per 24 hr, and four 1600 to 2016 tons each per 24 hr. Two of the furnaces were built during the war, one in 1942 and the other in 1943. It is intended to build two more blast furnaces which, upon completion, should bring the output of iron for the complete plant up to 17,920 tons per 24 hr.

A huge building encloses the larger portion of the blast furnaces and enables the workpeople to be protected from the weather. Ventilation is so good and the roof so high, that it actually felt cooler around the furnace than it would if it were open and exposed.

The only coal consumed as a raw material goes to the coke ovens, where a vast dump with overhead grabs deals with the huge stock extremely expeditiously. Coal is brought from the Kuznits Basin, a distance of 1000 miles. A steel works at Kuznitsky is supplied with ore from Magnitogorsk in the wagons which, on the return route, bring the coal from Kuznitsky.

We next passed into one of the two large melting shops containing six stationary furnaces of 390-ton capacity each, and seven stationary furnaces of 210-ton capacity each. The latest types of instruments were well in evidence and the furnaces reverse themselves automatically on checker temperatures, voluntary reversing, of course, being possible when necessary.

Magnesite obtained in the Ural Mountains is used for furnace bottoms which are fritted in with a 10 pct mixture of basic slag. None of this flux, however, is used for ordinary fettling, and some dolomite is kept handy for fettling the top of the back bank. The bottoms appear to be of excellent quality as the limit of apparatus for dealing with a bad bottom seems to be a blast pipe which blows the residue steel to the tap holes after a gutter has been cut in the usual manner, and in spite of much questioning—not easy through interpreters—we were unable to obtain any evidence of bad bottoms such as we occasionally experience in this country.

Steel is tapped from each 390-ton furnace down to a launder with a twin opening at the mouth, and cast into two 225-ton ladles, each of a height of $4\frac{1}{2}$ m, which are carried above the molds by a 290-ton crane, there being six of these cranes in the pit side. Difficulty exists in insuring a similar quantity of steel being tapped into each ladle. At the tap witnessed by the delegation, there must have been a difference of 35 tons between the two ladles.

Roof temperatures are between 2912° and 3092°F, which they hope to be able to increase when they discover a suitable method of using the magnesite for roof and wall bricks; up to the moment, however, they are confined to silica which is obtained in the Urals. Monthly outputs are claimed to be 11,200 to 13,450 for the 210-ton furnaces, and 17,920 to 22,400 tons for the 390-ton furnaces. The plant works 7 days a week, repairs being effected to the furnaces as and when necessary. Five men are attached to each 390-ton furnace, and four men to each 210-ton furnace, but there is much communal working as the men appear to leave their own furnace during the melting period to assist on others, whatever may be the need. One fore-

No Open Conflict

"From what we gleaned, however, we believe that the unions have some independence in the pressing of wage claims and legitimately try to safeguard the interests of their members, but never to the point that would allow them to indulge in open conflict with the management or with the state authorities.

"It is recognized that the function and activities of the trade union may differ to some extent in a socialist state from what they are in a capitalist one, but never, in our view, to the point that seems to be accepted by the Soviet trade unions—that the workers' principal interests can safely be left to a workers' government, which must necessarily and at all times have the interests of the workers at heart. Our faith in the perfection of human beings, and particularly governments, however well-intentioned, has not yet reached that dizzy height."

master is in charge of every four furnaces and acts as sample passer.

No mixer was needed, owing to the excellent quality of the blast furnace iron, the capacity of this shop, plus another one of similar capacity, being sufficient to absorb the iron as it was tapped from the blast furnaces.

There are in the two shops a total of 12 furnaces of 210 tons capacity, each producing between 2800 to 3360 tons per week, and nine furnaces of 390 tons capacity getting between 4500 to 5600 tons per week each. These furnaces, we were told, were tapping 13 to 16 charges in the 168 hr. The total per week is therefore 74,000 net tons from both plants. Assuming that each furnace works 45 weeks out of the 52 per annum, the total annual output would be approximately 3.5 million tons. An additional new furnace will soon be in operation and should make this a conservative estimate. All the refractories are made on the plant premises.

There were two large blooming mills served by two groups of soaking pits. The first group consisted of 40 pits in ten smaller groups of four pits each group; these served No. 1 blooming mill. The output from these pits is approximately 6750 tons per 24 hr. No. 1 blooming mill has electric drive 7000 hp. The mill is a German type (Demag), with two men and one woman operators. The rolls in this mill are electrically balanced. The ingots receive 19 to 26 passes according to the quality of the steel, the average time taken to reduce to a bloom of approximately 12×10 in. is 100 sec.

A second 36-in. mill reduces the bloom to a billet of about $4\frac{1}{2}$ in. The billet then passes to two continuous mills, rolling down to $2\frac{1}{2}$ in. The output of these mills is approximately the same as the soaking pits which serve them, i.e., 6750 tons per 24 hr.

No. 2 blooming mill, which was built by the Russian engineers, is served by six groups of soaking pits, four pits in each group. The capacity of each pit is eight ingots.

Then a fine strip mill of 14 stands, rolling strip for tubes and the motor industry. Output in this mill was given as 2240 tons per 24 hr, and manned by one head roller and four assistant rollers.

We saw two plate mills, heavy and light type. These were modern mills, but were not operating on the day of our visit, it being the monthly repair day. This also applied to a mechanized sheet mill which had been

installed and had been brought from Moscow during the evacuation in 1941. The fuel used in all these mills is a mixture of blast-furnace and coke-oven gas.

We visited some of the canteens on the plant. Some were better than others, and while the best of them were far below the best of ours, their general condition could be regarded as fairly good. They were clean and orderly with separate tables and single steel chairs. The workers seemed to be healthy and adequately fed even if the food lacked variety, this being as much due to lack of transport as anything.

Items on the menu included cabbage soup, price 40 kopeks, gruel, price 30 kopeks. (There are 100 kopeks in a ruble, a ruble being about $11\frac{1}{2}$ d. at the official rate of exchange.) This generally constitutes a worker's breakfast. For dinner there is gruel or cabbage soup, one portion of tongue (2 rubles 50 kopeks), biscuits (35 kopeks) with tea or coffee; 200 g of dried fruit can be purchased for 30 kopeks. Sour milk cheese at 35 kopeks, with the daily ration of bread, $2\frac{1}{5}$ lb, completed the general menu. Bread ration costs 1 ruble. Special items for transport workers or workers on pickling jobs, such as rice and eggs (2 rubles 50 kopeks) were on the menu. Single persons surrender all food ration coupons.

Zaporozhe—Former Socialist Model

Our next visit was to Zaporozhe, a town on the Dnieper Bend about 800 miles south of Moscow. On all sides the great cornfields and well-laden fruit trees were evidence that we were in the rich Ukraine area that for generations has dangled before the eyes of a rapacious land-hungry Germany who, in her efforts to obtain it, has shed the blood of millions of her sons. Well, she had it for 2 yr and many are the marks she left for which the name of Germany will long and bitterly be remembered, and with every good reason.

The town was regarded by the Soviet people as a model Socialist city with a population of 100,000. It was captured by the Germans in 1941, and when the Red Army retook it in 1943 it was a shell with only 7 pct of the houses barely habitable, and we were told that out of the 100,000 inhabitants, just four were left when the Russians re-entered, the rest having been either killed or deported as slave labor to Germany.

But it was when we visited the steel works that we saw what expert and systematic destruction really is. A first-class modern steel works that took 5 yr to build and only completed in 1934, was one mass of tangled steel and rubble. Before the war it employed 17,000 people. It had ten openhearth furnaces, three of 245-ton capacity, one of 225-ton, and six of 200 ton. There were three blast furnaces, two producing 1120 tons and one 1650 tons in 24 hr. A fourth was near completion when the Germans entered in 1941. We were told that the ingot output was 2 million tons per annum.

All this was a mass of ruin. One blast furnace was completely blown off its base and was lying on its side. The steel furnaces were blown from the checkers up; supporting girders stood twisted and gaunt like arms raised in protest at the desolation and destruction around. It made steel workers who knew something of the effort, toil and skill that goes to the making of a modern steel works burn with resentment to see such a fine plant completely destroyed. And what angered them more was the knowledge that this was not done in the heat and turmoil of battle, on a piece of freely contested ground. If it was just that it

would be accepted as part of the price of war. Here, however, we saw an example of what cold calculated destruction really meant when carried out by experts who knew where to place every ounce of dynamite where it was likely to do the greatest damage. It was too thorough to have been merely an attempt at disabling the enemy in the field, it was something deeper and more significant than that. Its aim was deliberately to destroy and lay waste a thriving and valuable industrial area that played an important part in the economic life of the country, and upon which large numbers of the Soviet people depended for their livelihood. Over 19,000 tons of scrap had been cleared away before we saw it, yet it was still one jig-saw mass of twisted steel. Repairs were going on and one blast furnace was almost completed, but in our view, it will take as long, if not longer, to restore it as it did to build it in the first place.

We were told that little of this was due to the "scorched earth" policy practiced by the Russians. They had only taken what mill equipment they could after the sudden collapse of their southern front in 1941.

Trade Union Activities

There are 180 trade unions in the USSR covering a membership, of which accurate figures could not be obtained, but reckoned between 20 and 27 million.

The Russian trade union is based on the principle of one union for the industry. The Metalworkers' Union, therefore, covers all the workers employed in the iron and steel trade. It has a membership of approximately one million. It is governed by a congress which is held every 2 yr, consisting of delegates from the plants, on the basis of one delegate for every 300 members. This congress elects a general council of 35 members, and out of these the council elects 11 to act as a presidium for the period of the 2 yr. The central council meets every 3 months and the presidium meets fortnightly. All the permanent officials are elected every 2 yr by congress. The elections of the central council, we were told, were by secret ballot.

The trade union contributions were about 1 pct of the wages and the union representatives obtained details of each worker's earnings from records supplied by the management. Contributions are not deducted from the wages, this, we were informed, being illegal. They are collected by group leaders and the system is very similar to ours where stewards do the work, but they use the stamp system and each worker is given a stamp equivalent to the contribution due from him.

We were told that the percentage of employees organized was about 90 pct, but we failed to find one non-unionist. This is not surprising because we felt it would require one of a very strong character, or someone who was so shiftless and irresponsible that he cared not what happened, to remain outside the union, having seen something of the power it possessed and the authority it had over the workers of the plant. Everyone we questioned admitted that he or she was a member of the union.

Some of us, however, were not quite satisfied that there existed what we would regard as a real non-union element, and certainly not an anti-union element. It should be an easy matter to make everyone toe the line and become a member if for no other reason than that those who are members of the union receive a

higher scale of social insurance benefits than the non-unionist.

At each plant there is a trade union committee consisting of representatives from each department. The committee is elected by ballot and the chairman is a full-time official in plants where there are more than 1500 workers employed. The secretary of the committee, in some cases, is also a full-time official. Each department with more than 50 members elects a committee, and within the department there are groups or brigades, as the Russians call them, each with a brigade leader. It is these leaders who collect the contributions. No payment is made for this, the work, we were told, being done voluntarily.

There is in most shops what is called a conflict commission, which deals with any local disputes between the management and the men. We saw little evidence of branch activity in the sense we understand it. It was plain, however, that the union officials were as much concerned about increasing production as the management. One thing that struck us was the pride shown at one works by the union officials when displaying a large banner the mill department had won for the highest output in the whole of the Soviet Union. With this banner, incidentally, went a bonus of about 1 week's wages to everybody employed in the mill.

The rate of a job is discussed in the first place by the trade union committee and the management. If they fail to agree, the case is referred to the central council of the union, which takes it up with the director of the plant. Failing a settlement, and this would probably happen only if large numbers were involved, the All-Union Central Council of Trades Unions, the equivalent of our TUC, comes into the picture. They if necessary, raise the matter with the commissar of the industry, whose word, in the last resort, is final.

There is no question of striking because this is illegal. The procedure for dealing with local disputes is very much similar to our own practice. It will be noted, however, that the unions are subject to some control by the All-Union Council.

Another feature that struck us was that the chairman of the trade union works committee has an office on the plant for which the union pays no rent, and this office is second in importance only, in size and in the quality of its furnishings, to that of the managing director's. Whether this is a sign of the union's authority, or a sign that the trade union official is simply part of the managerial setup, is a question that could only be answered by someone with more time to examine it than we had, or probably by being employed at the plant for some time.

We do not think there can be any doubt that most of the local activities of the Soviet trade unions are concerned with sport, what they call culture, welfare, and social insurance. The emphasis seems to be all on these rather than on wages and conditions. We do not wish to suggest that the unions have little to do with wages, but there is nothing like the effort devoted to this question as there is with us. This is shown by the way their funds are spent.

We were told that 80 pct of the contributions collected were returned to the plants and administered by the trade union works committee. According to the information given, 23 pct was spent on sport, welfare, such as pioneer camps, and rest homes; 12 pct on child welfare; 15 pct financial aid to needy members; and 25 to 30 pct on educational and cultural activities.

From what we gleaned, however, we believe that the

Not One Nonunionist

"... The trade union contributions were about 1 pct of the wages and the union representatives obtained details of each worker's earnings from records supplied by the management. Contributions are not deducted from the wages, this, we were informed, being illegal. They are collected by group leaders and the system is very similar to ours where stewards do the work. . . .

"We were told that the percentage of employees organized was about 90 pct, but we failed to find one nonunionist. This is not surprising because we felt it would require one of a very strong character, or someone who was so shiftless and irresponsible that he cared not what happened, to remain outside the union, having seen something of the power it possessed and the authority it had over the workers of the plant. Everyone we questioned admitted that he or she was a member of the union."

unions have some independence in the pressing of wage claims and legitimately try to safeguard the interests of their members, but never to the point that would allow them to indulge in open conflict with the management or with the state authorities.

It is recognized that the function and activities of the trade union may differ to some extent in a socialist state from what they are in a capitalist one, but never, in our view, to the point that seems to be accepted by the Soviet trade unions—that the workers' principal interests can safely be left to a workers' government, which must necessarily and at all times have the interests of the workers at heart. Our faith in the perfection of human beings, and particularly governments, however well intentioned, has not yet reached that dizzy height.

Social Insurance: With regard to social insurance functions, the unions are simply the agents of the government. The insurance funds are derived from contributions made by the factories, the workers contributing nothing. The amounts contributed are fixed separately for each industry by the government and they take the form of a percentage of the total payroll. This varies in accordance with the nature of the industry. In arduous or dangerous trades, the percentage is higher.

The administration of the funds is carried out by the trade union committee through a social insurance council. This council decides the exact amount of benefit to be paid, which varies, for there seems to be no standard or uniform system of benefits applying equally to all.

We were told the benefits paid to trade union members for sickness or accidents amounted to 50 to 100 pct of their wages, depending first on the length of time a man had been employed and his present occupation, non-unionists, as stated, receiving lower benefits.

Working Conditions: The 8-hr day is general in the iron and steel industry, the normal working week consisting of 6 days. In the melting shop and mills they work a continuous week. The cold departments close down on Sundays. There is no Saturday afternoon off, but instead of an 8-hr shift on Saturdays, 7 hr are worked.

We were informed that every worker had 30 days' paid holiday annually, and after 3 years service at the same undertaking was allowed 3 additional days. The holidays, however, had been suspended during the war. While we could not dispute the statement made, the

Cold, Calculated Destruction

"... All this [Zaporzhe] was a mass of ruin. One blast furnace was completely blown off its base and was lying on its side. The steel furnaces were blown from the checkers up; supporting girders stood twisted and gaunt like arms raised in protest at the desolation and destruction around. It made steel workers who knew something of the effort, toil and skill that goes to the making of a modern steel works burn with resentment to see such a fine plant completely destroyed. And what angered them more was the knowledge that this was not done in the heat and turmoil of battle, on a piece of freely contested ground. It it were just that it would be accepted as part of the price of war. Here, however, we saw an example of what cold calculated destruction really meant when carried out by experts who knew where to place every ounce of dynamite where it was likely to do the most damage. . . . Its aim was deliberately to destroy and lay waste a thriving and valuable industrial area that played an important part in the economic life of the country and upon which large numbers of the Soviet people depended for their livelihood."

doubt did cross our minds whether the Soviet Union in its drive for the rapid industrialization of the country, which was intensified after the advent of Hitler, would have been disposed to give each worker a month's holiday each year, or indeed whether there existed within the Soviet Union adequate facilities for 20 to 27 million trade unionists and their families alone to enjoy such a lengthy holiday. Wages paid during the holidays are the average of the previous 12 months.

Women are employed on a considerable scale, and we were told that 35 pct were employed during the war years in the industry, but this was down to 20 pct in peacetime. There are no women employed on the melting furnaces, but all the cranes and the controllers were operated by young women, with the exception of the melting shop charging machines, casting cranes, soaking pit cranes and the blooming mill main controls. We saw a woman employed catching and barring in the mill, and women were doing many jobs which we would not regard as suitable for women. We found that women in the professions were ardent advocates of sex equality, but we doubt, however, having seen some of the work women do, whether their sisters in the rougher and dirtier jobs have the same strong convictions.

Apart from one or two jobs where the machine sets the pace, we would not say that the workers were in any way overworked, nor was there any sign of anybody being driven. On the contrary, our impression was of a certain casualness which suggested that if they were not quite enjoying the work, they were quite content with what they were doing and doing it in most cases efficiently.

There appeared to be no shortage of labor around the plants, and a good proportion consisted of young people.

Wages: It is very difficult to give anything like a clear or accurate picture of the wages paid in the industry. Melters' wages on the best furnaces are said to average from 2000 to 3000 rubles a month. In terms of English currency, at the official rate of 21 to the pound, this means £95 to £140, or £24 to £35 per week. The official rate of exchange of about 21 rubles

to the pound is somewhat fictitious. Anyhow, it has very little meaning in terms of pounds, shillings, and pence, as the following things priced in the open market show:

	Rubles
1 bunch of radishes.....	30
1 cabbage	45
½ lb chocolate	100
1 small cucumber	7
1 lb beef	75
½ lb red currants	3

The real value of the wages earned is in the goods that can be bought with them, and this was sharply brought home to one member of the delegation who tried to buy a pair of shoe laces from a hawker in the street and was asked 10 rubles, equal to 9s, and also when he spent the total of his winnings at a football match (11 rubles, or nearly 10s) on a box of matches.

We were told that the average wage paid in the iron and steel industry is about 900 rubles a month. Only 5 pct are paid on day or time rates, the remainder being on piece work. No overtime is paid for week-end work, but is paid for any time worked over the 8-hr shift.

The standard of living of the Russian iron and steel worker, apart from war scarcities, is without doubt considerably lower than ours. Everything is rationed. The worker gets his rations through works shops and through the canteens, but extra goods can be bought in the legal black market at fantastic prices. For instance, potatoes which were practically unobtainable in Moscow hotels and shops could be bought at the Central Market, where the peasants are allowed to sell their surplus at 75 rubles (or about £3 10s) for 2 lb. There are also what are called commercial shops, which sell the few consumer goods, such as clothing, shoes, at fancy prices three or four times above the normal.

There are various classes of shops, one where the workers can buy their rationed supplies of clothing, etc.; another where clothes can be bought only by exchange of similar garments; military shops for officers of the Red Army; shops reserved for the professional classes; and commercial shops. It is only in the latter that goods can be had without coupons. What happens, as far as we could gather, is that the Soviet Union being desperately short of all classes of consumer goods, sell what surplus is left over from what are obviously required to maintain the rationed allocation, to those who have plenty of rubles, but find nothing to do with them. We asked who were the people who patronized these commercial shops, and were told everybody who had money to burn. For instance, a Red Army officer coming home on leave after a long absence would pay any price to give his wife a dress or some other present. This was nothing more than an ingenious and extortionate form of luxury tax, although some people would call it a piece of state brigandage, and as these shops were run by the state who reaped the profit, that description may not be so far fetched. In a capitalist state, we expect that kind of thing where private individuals can dodge the controls imposed by government, but to us it seemed hardly the kind of dealing one should witness in a socialist state.

Housing: The housing conditions are certainly acute. They could not be otherwise considering the destruction caused by the war. But the war has only intensified what must have been pretty bad before. We

inspected some workers' flats in Moscow, and while we give details of these, they certainly cannot be taken as any criteria of the housing conditions generally, and we believe our Russian friends would be the first to admit it. Some of the housing conditions we saw at Magnitogorsk and around the Hammer & Sickle works at Moscow were simply primitive, one room per family being the rule rather than the exception.

The flats described below were built by the Hammer & Sickle plant, which provides for 40 pct of its employees:

- (1) The home of an annealer, aged 62, with his wife and grown-up daughter (aged 17 or 18 yr)—two rooms (there was a bed in each of them), kitchen, bathroom, and scullery. The normal rent is 130 rubles per month. Rent covers gas, electricity, central heating, and hot water. As this man has reached the retiring age (62 yr), qualification for pension automatically reduces his rent to 100 rubles per month. He is still working at the plant, but this does not interfere with the automatic reduction rent—that goes with the old-age pension. The worker's income (not the total household income) varies from 800 rubles to 1000 rubles per month, showing his rent as from 8 to 10 pct of his income.

- (2) The home of a Stakhanovite melter—same accommodation as first flat, but a family of four, melter, wife, and two boys, aged 10 and 12 yr. In this house we were able to record the daily rations allocated to men in hot and heavy jobs. *

	R.K.
1,200 g bread: white	2.4
black	1.20
500 g vegetables	75
400 g meat	5.20
50 g gruel	45
93 g fats (butter, etc.)	1.70
36 g sugar	18

(Plus 1 pt of milk per working day)

The above includes the following extras for hot work:—

100 g bread
100 g meat
10 g sugar

Also included are the following extras for very heavy work:

100 g bread
50 g fat
10 g sugar

(There are about 28½ g to the oz.)

Matches, salt, and all sorts of condiments and things of that description, even vodka, are on the ration. Tea is no problem in the Soviet Union, but cocoa and coffee are on the ration.

- (3) The home of a Stakhanovite roller. Same accommodation as in the other two cases, but for two adults (husband and wife) and one daughter aged about 12 yr. Rent here is 135 rubles per month, including gas, electric light, central heating, etc. Here we learned that rents vary according to



BRITISH VIEWS THE USSR
CHELYABINSK is one of the Soviet's newer steel works. Built in the Urals after the German invasion, it now produces close to 800,000 net tons of pig iron. Shown here is blast furnace No. 2, built in 9 months and producing about 390,000 net tons of pig iron a year.

wages. Under 700 rubles per month, the rent standard is lowered (or for pensioners); over 700 rubles it is graded above the standard. The roller in an ordinary month earned around 3200 rubles—he has earned from 5000 to 6000 rubles when working overtime.

Russia is such a land of contrasts and contradictions that a visitor can come back with any impression he likes and most suited to any previously conceived notions he may have held.

One strong impression, however, which was gathered by every member of the delegation is that the workers in Russia have a long way to go before they reach anything like the standard of living existing here in Britain. Bearing in mind the conditions that existed in Tsarist days, this should not need stating but for the unbalanced picture we have been given, and the extravagant claims made for Soviet achievements during the last 15 yr, mainly by people who went there less to see what had actually been done than to prove to the world that the system in Russia was an outstanding success.

Regarding the iron and steel trade, some of the equipment is antiquated and some is modern. The practice of steelmaking is quite up to date, but nothing that is in advance of our own. The workers are quite competent in their handling of the tools and the processes, and are as apt with them as our workers are.

There has been a terrific drive, and this will be intensified in future, to develop a highly industrialized State. So much emphasis is placed on this, that every girl seems to want to be an engineer. Yet in spite of this keenness, little importance is attached to the care of the machine. Proper maintenance is something that not only the workmen but those higher up seem to regard as of little consequence. The idea seems to be to do just what is necessary to keep the wheels running; the rest doesn't matter much. Wherever one turned, this could be seen. The proverb that "a stitch in time saves nine" has very little currency among the Russians. A few more slogans about the care of the machine and a few less about the virtues of their leaders would not do the Soviet people any harm. In spite of all the propaganda drives, the stories of fabulous increases in production and the claims of the Stakhanovite records, we believe the output per man-

Pacific and Easy Going

"In whatever mold the governing authorities may ultimately compress them, the Russian people are essentially pacific and easy going. There is none of the boastful aggressive nationalism which is found among the German, and while they are abundantly proud of the Red Army and its achievements, a soldier is not regarded as one having title to a privileged place . . . he is looked upon by the rest of the people as just a civilian in uniform . . . never once had [we] the impression that they [the Red Army men] regarded themselves, or were regarded by the civilian population, as a kind of dominant class. . . ."

hour is considerably lower than with us. It is difficult to get statistics to prove this. The production charts we saw only gave the percentage increases of this or that. Judging by the number of people we saw about the works, there certainly seemed to be a larger number employed around the plants than would be the case in comparable British plants.

It has been said before that the people seemed adequately fed. Their outdoor clothes were neat but of inferior material, and any old rags are worn at work. The children and young people have been well looked after. They looked clean, healthy, and sturdy, and full of liveliness and curiosity. One thing they are unrivalled at is singing and dancing. We saw a group of young men and girls at Magnitogorsk give a show that for polish and sparkle would have done credit to a London stage, and these young people were working in the steel works by day and living in conditions that were far from ideal. Only a people with the love of the arts in their blood could do it. In whatever mold the governing authorities may ultimately compress them, the Russian people are essentially pacific and easy going. There is none of the boastful aggressive nationalism which is found among the Germans, and while they are abundantly proud of the Red Army and

its achievements, a soldier is not regarded as one having title to a privileged place in the sense that people moved out of the way for him to pass. He mixes and takes his turn with the rest, and one strongly gathered the impression that, as with us, he is looked upon by the rest of the people as just a civilian in uniform.

It is true the army has certain privileges and has first claim on the strained resources of the country, being in that no different from the armies of every other country during the war. But we have seen the Red Army men in theatres, at football matches, mixed with them in planes and at airdromes, and we never once had the impression that they regarded themselves or were regarded by the civilian population, as a kind of dominant class that stood apart. In spite of the fears one hears expressed that Russia will now become militarist, we saw nothing to suggest that war will ever have the fatal attraction for the Russian people that it had for the Germans. They ardently want peace, and the ordinary people are looking to the British people to help them secure it. The ways their government adopt to insure it may appear strange and obscure to us, but there can be no doubt of the attitude of the mass of the people.

Over the last 20 yr the Soviet Union have done many things that would have been better done if the authorities had been less concerned about making a show. They have attempted to excel in some things, with only a technical experience and training of at the most 25 yr, the achievements of countries with a hundred years or more technical and industrial tradition behind them. It could not be done.

There has been such a desire to impress the world with the rapid advance that can be achieved in a state which has proclaimed itself socialist, that too much has been done in a hurry and not done well. Some of the huge buildings of workers' flats that look so well in illustrated brochures are already becoming the slums of this generation. When Russia's builders are as good as her architects she will be able, with full confidence, to invite the world to admire her achievements in this field.

Underwater High Frequency Tempering

UNDERWATER tempering of steel surfaces by high-frequency current is now being introduced on a wide scale in Soviet industry, according to a report by Dr. Mikhail Lozinsky and B. Kholmisky published in the USSR Information Bulletin. The method consists of immersing in water both the article to be treated and the inductor. The water cools the inductor, and the method is said to produce a surface 50 to 100 pct more durable than that produced by previous methods.

This is a development of the method invented several years ago by Corresponding Member of the Academy of Sciences of the USSR, V. Vologdin, Dr. G. Babat, and Dr. Lozinsky, employing high-frequency eddy current to temper steel surfaces. The principle underlying this invention was the decrease in depth of the electrical field passing through the metal while the frequency of the current was increased. For instance, if an ordinary 50 cycle light current were to be used to heat steel, the heat would pass to a depth of 90 mm. On the other hand, if the frequency is raised to 100,000 cycles, nearly all the heat is concentrated in a thin surface layer no more than 2 mm thick,

which is sufficient for surface tempering as practiced by the cutting tool industry, for instance.

Until recently, however, high-frequency tempering suffered one substantial shortcoming: the method could not be used to treat inner surfaces, tiny holes in gears, bushings, or narrow slits and intricate grooves. The cooling of the induction coil or inductor inside which the part to be treated is placed, posed a difficult problem. The underwater welding of ship hulls, however, presented a possible clue. Water is a poor conductor of electricity, and hence the loss of current through it could not be great, and since steam, which was bound to form at the surface being heated, is a poor conductor, the heat loss would likewise be small. The inductor, on the other hand, would have a perfect cooling system.

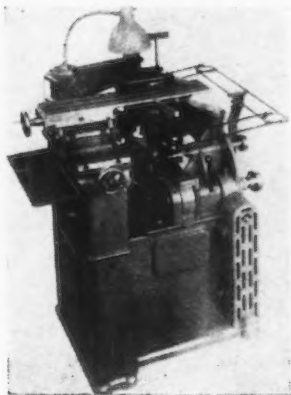
The first experiments proved that this reasoning was correct. Not only could the inside surfaces of steel bushings be heated under water, but these could actually be melted without any damage to the inductor. The method has been used in heat treating the most complicated dies and parts with holes 15 mm in diameter, and the thickness of the tempered surface layer may be adjusted to a fraction of a millimeter.

New Equipment . . .

Machine Tools

Various types of grinders, such as profile, internal, cutter and tool, together with special purpose milling and drilling units, boring machines, and metal cutting saws are featured in this week's review.

DESIGNED specifically for grinding the profile of hardened parts, such as form tools, profile gages, and sectional dies for use in machine and watch manufacturing industries, a profile grinder has been announced by *Fritz Studer, Ltd.*, Glockenthal-Thun, Switzerland. Known as the Model PSM,

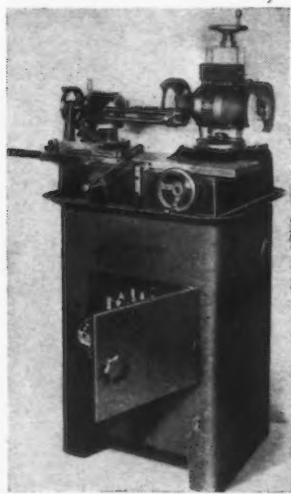


this machine will handle flat workpieces up to a maximum thickness of 2 in., and a maximum length of 5.9 in., and circular parts up to a maximum diameter of 4 in., with a tolerance of 0.0002 in. The principle of operation consists in following the form of a template, enlarged in suitable proportion, by means of a tracer finger swivelling about its point. Linear movements are transmitted to the grinding wheel head through the pantograph, and swivelling movements by turning the wheel about its cutting edge through link bars. The wheel must be shaped beforehand proportionately to the exact shape of the tracer finger point, and in the same ratio as template to workpiece. The pantograph can be adjusted to any ratio required. Diamond holder and workpiece are both fixed on a revolving table mounted on the vertical slide and can each in turn be placed opposite the grinding wheel. The stroke of the verti-

cal slide can be set from 0 to 2.44 in. A special attachment allows the grinding of profiles up to 360°, as for instance on disk cams, original parts of clock mechanisms, and similar items. Also available for use with this machine is a device for dressing diamond wheels to permit the grinding of cemented carbide dies. The machine is sold by Cosa Corp., 405 Lexington Ave., New York 17.

Tool Grinder

KKNOWN as the D-S, a tool grinding machine that makes radial-helix relief grinding easier than regular angular back off relief grinding has been announced

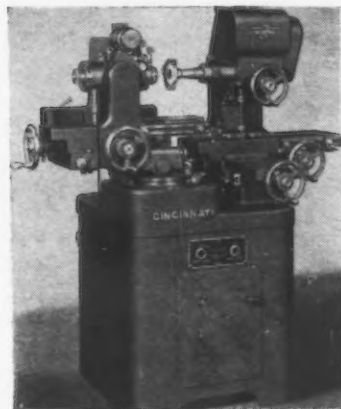


by the *D-S Grinding Div. of Royal Oak Tool & Machine Co.*, Royal Oak, Mich. The grinder provides for radial relief sharpening to the cutting edge with no undercuts. Sharp intersections are obtained and any desired margin may be left on blade sides. Radial and helical relief can be produced simultaneously and can be varied to meet all practical requirements. Cam and index plates make possible the grinding of any tool of 1 to 12

flutes with identical relief on each blade. The D-S has been described as a universal machine that can be used for relieving end cutting, form, taper or side cutting tools, flute grind as well as circle grinding and other tool grinding work.

Cutter and Tool Grinder

CUTTER shapes involving convex or concave radii, and having straight, tapered, or helical teeth can be resharpened or ground from the solid, it is claimed, without the use of special attachments on the Monoset cutter and tool grinder, a product of the *Cincinnati Milling Machine Co.*, Cincinnati 9. While the Monoset may be used for conventional resharpening of end mills, reamers, counterbores, form cutters and other special tools, it is said to be particularly useful for preparing unusual or problem cutters, special size drills, etc. The flexibility of machine movements and many built-in features enable most jobs to be performed with a single chucking. The

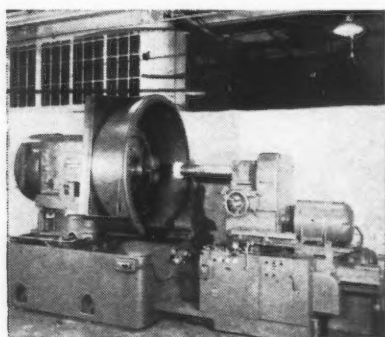


workhead, mounted on a large turntable base, may be swiveled through 235° and adjustable stops are provided to limit its arc of travel. An adjustable transverse slide provides for the grinding of

radii which have their centers offset from the centerline of the work piece. A built-in spiral lead mechanism provides a means of generating right-hand or left-hand spirals having leads as short as $1\frac{13}{16}$ in.

Internal Grinder

DESIGNATED as the No. 150, a large internal grinder has been developed by the *Bryant-Chucking Grinder Co.*, Springfield, Vt. The design follows the conventional Bryant practice of a wheel-slide carriage attached to a hardened steel bar, supported by and sliding in pressure-lubricated bearings. The cross feed is so arranged

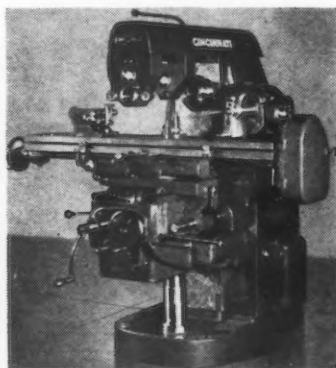


that the relation between multiple diameters can be conveniently and accurately maintained by gage blocks. A face plate or other suitable fixture may be attached to the front of the spindle and provision is made for mounting face plate jaws at the rear of the spindle. A wide angular adjustment of the workhead is possible and hardened steel rails are provided for cross-wise and longitudinal adjustment of the workhead to suit a wide variety of work.

Milling Machines

A MEDIUM size knee-and-column type milling machine has been announced by the *Cincinnati Milling Machine Co.*, Cincinnati 9. Designated the No. 2 MI, the machine is powered by a 5 hp motor, and built in plain, universal (illustrated) and vertical styles. These machines have exceptionally wide speed and feed ratios, 60 to 1 and 120 to 1, respectively, covering the latest requirements for all types of milling operations encountered in the metal working industries. Sixteen spindle speeds, ranging from 25 to 1500 rpm are changed with a single crank type control. The crank operates a hydraulic selector valve, while the actual work of

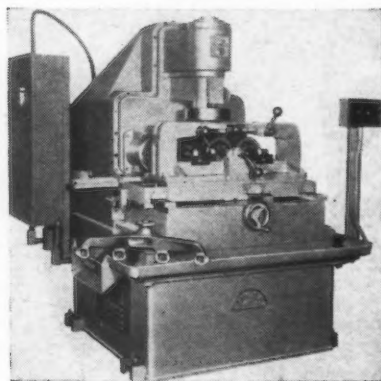
shifting gears is performed hydraulically. A mechanical spindle reverse offers a quick and easy reversal of spindle rotation to suit



the hand of the cutter. Feed rates are changed in the same manner as the speeds, from $\frac{1}{4}$ to 30 ipm. Feed controls are independent of each other, and each feed lever has a forward, neutral, and reverse position. Live rapid traverse, at the rate of 150 ipm longitudinal and cross, and 75 ipm vertical, may be engaged through a lever control at the side of the knee. Vertical style machines have essentially the same controls and construction as horizontal machines, with the exception of the back gear shift lever on the left-hand side of the vertical head.

Special-Purpose Mill

TO meet specified requirements of accuracy, finish and rate of production in milling pads on automotive manifolds, a special-purpose machine has been built by *Snyder Tool & Engineering Co.*, 3400 E. Lafayette, Detroit 7. The part is located by means of guides in a work-holding fixture and is clamped manually by means of

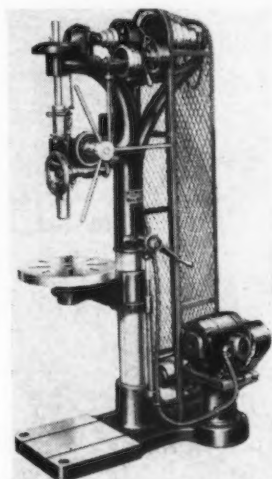


cam-action clamps. All spindles in the five-spindle milling head are mounted in anti-friction bearings and helical gears are used throughout. The head and fixtures

are cast iron construction. The cutters travel past the work for the machining operation, which is entirely automatic after the starter button is pressed. An in and out adjustment is provided for the sub-slide to facilitate cutter loading and adjustment. The welded steel base houses the hydraulic equipment for the travel of the milling head.

Drilling Machine

EQUIPPED with motor drive and belt guard or with tight and loose pulley drive when operating the machine from a line shaft, a 20-in. drilling machine has been manufactured by the *Sibley Machine & Foundry Corp.*, South Bend 23, Ind. This machine is especially designed for drilling up to $1\frac{1}{4}$ in. in cast iron, or the equivalent in other metals. The drill table rotates on an arm which swings on the $5\frac{1}{4}$ -in. diam column, to provide

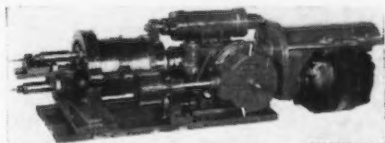


maximum working space. Both power and hand feed are furnished. On the motor drive unit, the motor is mounted on a pedestal, supported by a rigid base cast integral with the machine. The V belt is adjustable through a hinged motor mounting plate. Features of the machine include wide interchangeability, with all parts tooled for accuracy and fit. Only forged high-quality steel is used in the spindles, and the Morse taper is bored in the spindle after the assembly is complete.

Drilling and Tapping Unit

FOR drilling and tapping pipe plug holes in automobile rear axle housings, or similar parts, in one handling and in connection with other operations performed at the same time, a drilling and tap-

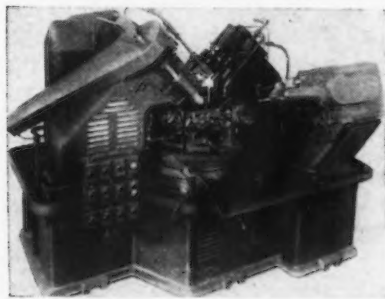
ping unit has been put on the market by the *W. K. Millholland Machinery Co.*, 1048 Fairfield Ave., Indianapolis 5. This unit consists of a standard motor-driven automatic work unit with a 2-spindle head attached and supported in a housing mounted in the same base plate with the unit, and operated



by it. The individual unit, which has an automatic cycle and is started by remote control from a solenoid valve, is mounted on the base of a double end boring and reaming machine. When the work is loaded into the fixture and the operation of boring is started, the drilling and tapping operation is automatically started by electrical control, and finished by the time the boring is completed.

Special-Purpose Machine

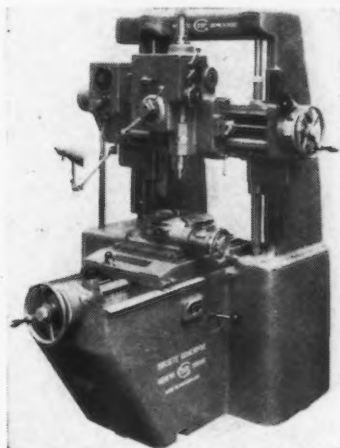
A SPECIAL-purpose four-stage machine for the drilling, spot-facing, counterboring and tapping of the vacuum holes in intake manifolds, has been completed by *Hydraulic Machinery, Inc.*, 12825 Ford Rd., Dearborn, Mich. The cycle of operation is entirely automatic except for loading and unloading. Upon closing the safety door after parts are manually loaded and clamped into position, electric contact is made and the machine automatically indexes to position, all



heads moving forward and completing the cycle of drilling, spot-facing, counterboring and tapping. The production rate is said to be 120 manifolds per hour. Provisions are made to prevent indexing until parts are properly clamped in position. Hydraulic power and control valves are mounted in the base.

Jig Borer

INCORPORATING built-in measuring screws and micrometer heads, a SIP jig borer, type 3K, manufactured by *Societe Genevoise D'Instruments de Physique* of Geneva, Switzerland, has been announced by the *Cosa Corp.*, 405 Lexington Ave., New York 17. The jig borer, which is of the planer type, has a table working surface of 20½ x 15 in. Direct readings are made to 0.00005 in. on the verniers of large divided drums. Automatic correctors compensate for any source of error in the measuring devices and there is a guaranteed accuracy for all settings of work table and spindle saddle of 0.0002 in. The 3K has eight spindle speeds ranging from 75 to 2000

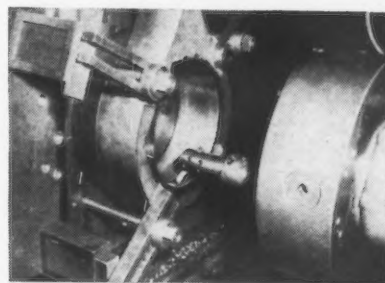


rpm and six automatic feeds in either direction. The cross-rail is traversed vertically by a motor driving two elevating screws of high precision which guarantee the accuracy of its horizontal position. This machine is also supplied with a special guiding arm which facilitates the machining of very small holes and a depth measuring device which permits the boring head to be accurately limited.

Boring and Facing Attachment

A VARIETY of boring, turning, grooving, recessing and threading operations, difficult to handle on ordinary equipment, are simplified by the continuous feed facing and boring head manufactured by the *Giddings & Lewis Machine Tools Co.*, Fond du Lac, Wis. This attachment may be mounted either on the spindle sleeve of the Giddings & Lewis horizontal boring machine headstock or, with suitable adaptor, on a line boring bar. When the unit is placed on

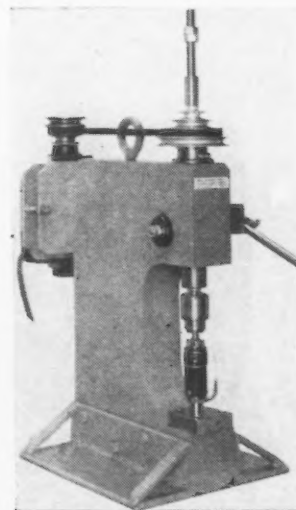
the headstock, the machine spindle extends through the attachment head and operates either independently or simultaneously with the head. The continuous feed facing



head used with an adaptor and mounted on a line boring bar simplifies the machining of hard-to-reach surfaces. The attachment proves unusually helpful in machining workpieces which are large and cumbersome and which cannot be easily reset. Continuous feed facing heads are available in sizes ranging from 17 to 60 in. in diameter. Cross travel of the tool slide ranges from 10 in. on a 22-in. diameter head to 34 in. on a 60-in. head. The maximum facing diameter is 32 in. using a 22-in. continuous feed facing head and 96 in. when a 60-in. facing and boring head is used.

Spin Dimpler

THE spin dimpling method developed by the *Topflight Tool Co.*, York, Pa., for dimpling high stressed aluminum and magnesium

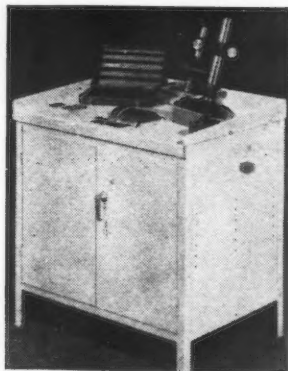


alloys, is said to eliminate the difficulties created by the standard dimpling methods. Dimples formed by spinning, rather than by pressing or pounding, are free of cracks and a sharp corner at the face of

the sheets is obtained, it is claimed. The spin dimpler, illustrated, operates in connection with a new dimpling yoke equipment and gives excellent appearance of the dimpled sheets; corners of the dimples are sharp, like the corners of counter-sunk holes; there is no distortion. With the yoke, the tool can be operated by semiskilled and unskilled workers.

Centerless Lapping Machine

AN advanced principle of lapping for the precision finishing of cylindrical pieces is said to be incorporated in the design of the Model 100 centerless lapping machine announced by *Size Control Co.*, 4636 W. Fulton St., Chicago 44. A precision finish of less than 2 microinches is easily obtained, it



is claimed, on this machine, and lapping time is greatly reduced. One piece or a hundred can be lapped with no necessity for making set-ups, or using ring laps or other tools. Model 100 is furnished complete and ready to plug in with a set of lapping rolls ground for precision work, a vibrationless drive and a 1/2-hp motor, 110 v ac installed.

High-Speed Metal Saw

DESIGNED primarily for light gage steel and foundry application, a high-speed metal cutting band saw, the Zephyr 16, has been added to the line of the *DoAll Co.*, 1301 Washington Ave. S., Minneapolis 4. This smaller version of the Zephyr 36 has a 16-in. throat depth and a 10-in. thickness capacity. The machine has a variable speed range from 1000 to 5000 fpm. The combination of controlled saw speed and the special saw blade are said to make fast cutting rates possible in sheet steel, aluminum and ferrous and nonferrous castings as well as paper, wood, laminates, plastics and composition materials.

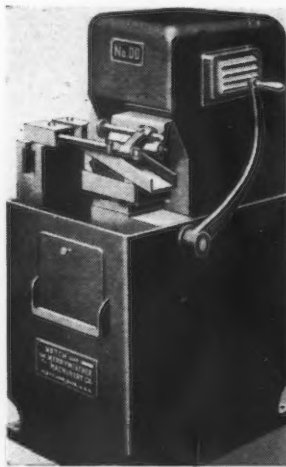
This new saw slices through 1/8-in. stainless, it is claimed, at 48.6 lineal ipm, 13 gage sheet steel at 150 in., 75 ST aluminum at 100



sq in. Aluminum, bronze, brass, copper, zinc, gates and risers from iron castings cut about as fast as the material can be pushed into the teeth of the saw, it is said. The table is of the tilting type, and there is a disk cutting attachment for making perfect circles, a rip fence and a mitering attachment for cutting of regular and compound angles.

Cut-Off Saw

EQUIPPED with a Triple-Chip saw blade, the No. 00 metal cut-off saw has been designed by the *Motch & Merryweather Machinery Co.*, Penton Bldg., Cleveland 13, for sawing ferrous and nonferrous metals. Tubing and sec-

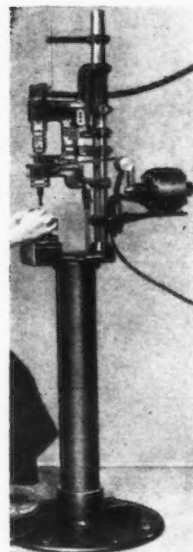


tion cuts on this manually operated tool are said to be square, free from troublesome burrs, with smooth surfaces that reduce subse-

quent machining expense. The No. 00 is available in either hand or power feed to the saw carriage, or it can be equipped with automatic cycling to both work and feed. Ferrous bars up to 1 1/4 in., nonferrous up to 2 in., and up to 2 1/2-in. tubing and shapes can be cut with this machine, which has three blade speeds, 160, 247 and 560 sfpm.

Spinner-Riveter

ESPECIALLY adaptable for use in assembly work on plastics, fiber, canvas, and insulating materials, a spinner-riveter, called the *Keyn Airflex*, has been introduced by the *Plymouth Engineering Co.*, Plymouth, Ind., for all types of coldheaded assemblies. A feature of this tool is its adjustable spindle



regulator for precise control of riveting force under maximum speed. The unit utilizes a narrow faced tool, which contacts only a fraction of the rivet at each blow. The tool is rotated while a pneumatic hammer strikes a series of rapid blows, spreading the peening over the entire surface of the rivet

head. Piston diameters range from 1/2 to 1 1/2 in. to handle work up to 1/2 in. diam.

Air Equipment Unit

CAPACITY performance and increased service life of machines, tools and other equipment operated by compressed air is said to be assured by use of the R-F-L unit developed by the *Logansport Machine Co., Inc.*, Logansport, Ind. In a compact casting measuring 6 in. sq x 4 3/4 in. deep, the unit incorporates the components of reducing valve, pressure gage, filter and lubricating device. All connections are built into the casting; all components are controlled from or visible on the front panel. The R-F-L unit can be used with old or new air equipment, is mounted in the air intake line from the main air line, and adapted to location on a central control panel.

Cut your teeth on stainless ?

If you have yet to cut your teeth on stainless steel, don't think it will be a painful process. Come to Rustless.

We can show you how to cut teeth in stainless without agony, how to machine it on most any type of equipment into gears, shafting, nuts, bolts and all kinds of products requiring high service performance and low maintenance through corrosion resistance. Stainless is not difficult to fabricate, just different. To learn how to take the differences into account, write for the helpful, full-color chart "Machining Stainless Steels." Rustless Iron and Steel Division, THE AMERICAN ROLLING MILL COMPANY, Baltimore 13, Maryland.

Sales offices in principal cities, distributors everywhere.

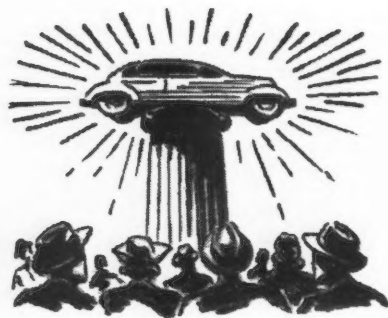
STAINLESS STEEL SPECIALISTS



Assembly Line . . .

WALTER G. PATTON

• GM holds press conference to explain low automotive output . . . Lead shortage feared, and steel still critical.



DETROIT — General Motors "opened its books" this week—but to the press rather than to Walter Reuther and the UAW-CIO!

While the GM books were not opened wide or for very long to the particular pages which would interest Reuther, the net result of President C. E. Wilson's "on the record" press conference was to increase substantially the public's understanding of current production problems in the automobile industry and to focus sharp attention on certain phases of the industry's operations that are likely to be troublesome in the months ahead.

Immediately following the press conference newspapers were on the Detroit streets with headlines which read "GM demands \$100 per Car Price Increase." Since this headline is at some variance with what was actually said it may be well to put the exact quotation on the record.

Q. "I understand the automobile manufacturers are now asking OPA for another price increase."

A. "Well our prices are not satisfactory on the present volume or possible volume of business at the present wage level."

Q. "That means, then, that you are looking ahead for further price

increases on this basis of production?"

A. "Well all I can speak about is General Motors and we should have additional price relief."

Q. "Have you asked for it already Mr. Wilson?"

A. "No, we probably are in the process of it, though."

Q. "Mr. Wilson how much further price advance do you think you should have?"

A. "Do you want just a nice round figure? About \$100 an automobile."

INCIDENTALLY, if GM is going to request an increase in the present price of its cars it would be interesting to know the basis on which such a request might be made. Careful examination of some of the GM employee-production relationships will throw considerable light on this subject.

While the following figures are not exact they do offer evidence as to what is happening to labor costs in the automotive industry.

In the fall of 1941 when the corporation was building approximately 55,000 cars per month, the average number of employees on GM payrolls (including appliance divisions), was 274,857 persons of which 52,535 were salaried and 222,322 were hourly workers. Including a comparatively small number of non-automotive workers,

this gives an average of about five employees per car built per week.

In July 1946 when only 25,000 cars were being assembled each week the average number of GM employees was 323,496 of which 70,148 were salaried workers and 253,348 were on an hourly basis. Again including some non-automotive workers, the average is 12.9 employees per car per week for 1946.

Meanwhile, average hourly wage rates have gone up, Mr. Wilson said, from 89.7¢ in September 1940 to \$1.28 in July 1946.

THROUGHOUT the discussion Mr. Wilson emphasized that the major problems facing the automobile industry at present are maintaining a proper flow of materials and parts through the plant and building an efficient worker organization. He called attention to the fact that in the case of great national strikes "the duration is longer than the war." A three or four month strike, he said, just doesn't take three or four months production; it takes six or eight months production because the strike brings about a disorganizing affect that cannot be recovered immediately after the strike is over.

It was something of a surprise to learn that the productivity of GM workers at the present time averages about 80 pct of the pre-

WELDER'S DREAM: *This all-welded automobile is the brainchild of body engineers who hoped to satisfy the exacting requirements of L. M. Benkert, general sales manager of Progressive Welder Co. in his present crusade for better accessibility of welded components. The dots indicate the welds.*

GAGES

THAT
"FALL
IN"...



RETAIN THEIR ORIGINAL
Accuracy LONGER

The quality of precision finished holes made to close tolerances is easily and accurately controlled at the machine or bench when P&W "Pilot" Plug Gages are used. When the machine operator desires to check the work-piece, the "Pilot" Plug is presented lightly at any angle to the hole. Without binding, the gage "falls in" the hole and the operator checks the fit.

The P&W "Pilot" feature prevents injury to the edges of precision finished holes and protects the gaging surface of

the plug. Pilot Gages give longer gage-life and reduce the cost of gaging.

They are carefully ground and precision lapped to XX, X, Y, or Z tolerances and are available in tool steel, chromium plate, cemented carbide or Norbide.

Write on your company letterhead to the address below or consult your nearest P&W Branch Office for further information on how to control the quality of precision finished holes with P&W "Pilot" Plug Gages.



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war level. Mr. Wilson explained that after the GM strike workers started with a "pretty good tempo, energy and will." The corporation, he said, didn't have as much trouble as was expected. He also pointed out it is pretty hard for a workman, even though he has the right attitude and is doing his very best to achieve efficient production, if he doesn't have materials to work with regularly.

Some of the corporation's failure to produce cars at expected rates, he said, could be attributed to inexperienced people. At the same time he emphasized the fact that absenteeism is three times the normal prewar rate.

Mr. Wilson said that the problem of high labor turnover and an improper attitude toward work was not exclusively a veteran's problem.

"We have veterans," he said, "that come back and do marvelously well very quickly. We have other places where if they are not interested in the work, they will show up for a week and then just disappear and say nothing about it."

The GM head conceded that unemployment compensation might be a factor in the present problem.

"If people got 50 pct as much for not working as they got for working," he explained, "I wonder how many people would be tempted (not to work)."

UP to the present time a shortage of raw materials has not directly affected the GM production picture, but it is a certainty that a raw materials famine will interfere with automobile output in the months just ahead.

Mr. Wilson revealed that a lead shortage is one of the most serious problems confronting General Motors at the present time. He disclosed that a few weeks ago the company did not have enough lead in sight to build storage batteries for September production, but has since been able to obtain a supply which will last until October. October supply is still in question.

Up to the present time General Motors has not delivered any cars which are not equipped with storage batteries, but the possibility of doing so had been discussed. Based on the evidence available to him, Mr. Wilson said, the total production of lead in this country is just not equal to the requirements and it will be necessary for GM to im-

port lead in order to provide an adequate supply. At the present time importation of lead by private business is prohibited by law, but GM is attempting to make arrangements to buy foreign lead, he said.

The automobile industry, Wilson explained, continues to be handicapped greatly by the shortage of sheet steel. Commenting on the steel industry, he emphasized that the industry has been hurt badly by the strike in the electrical industry and that delivery of new equipment to replace that which is obsolete or worn out has been set back in some cases for as much as a year. In other words, he said, the steel reconstruction program has been delayed a year by the disorganization of the business resulting from strikes and materials shortages.

At the present time, he explained, GM is getting about 75 pct as much steel as they would like to have; priorities for housing are affecting demand to some extent, he admitted.

Mr. Wilson also explained that because of the depletion of stocks of steel in warehouses during the war and the present scarcities has made it exceedingly difficult to replenish these stocks. Thus, steel users who have to depend on warehouses for their supply have been particularly hard hit.

THE facts about GM supplies of pig iron are a bit startling. At one time, the corporation got down to within 1½ day's supply of pig iron, but by shifting its supply around they were able to keep going. In the meantime, pig iron was imported from Utah and from Mexico and shipped to Michigan. The shortage, Mr. Wilson explained, was not caused by feeding back pig iron to GM suppliers who were running short.

Looking ahead, Mr. Wilson predicted that if there are no more strikes in suppliers' plants the corporation should be able to increase production about 20 pct in both September and October, and that November and December production should flatten out at about that level.

Some other interesting financial relationships applying in the automobile industry were revealed during the meeting. Mr. Wilson explained that to operate soundly in a manufacturing business like the motor car business the breakeven

point usually occurs somewhere between one-third and one-half capacity because no company can expect to operate at capacity 12 months in a year. However, the deficiencies caused by the disorganization or reconversion, the government controls and shortages, the training of a new working force and the fact that OPA expected "too much of us" has had the effect of holding the breakeven point at a comparatively high level of production.

It was disclosed that the corporation made a small profit in August and also in July. It might be inferred from this that the breakeven point for General Motors (counting such income as may be coming from appliance divisions), is now close to 50 pct of operating capacity.

Charges Lead Controls Threaten Auto Output

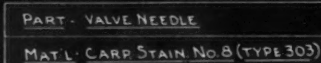
Detroit

• • • The automobile and truck industry faces shutdowns and unemployment within "a matter of weeks" unless the government takes emergency steps to remedy the acute shortage in the supply of lead, George Mason, president of the Automobile Manufacturers Assn. has informed John R. Steelman, director of Office of War Mobilization and Reconversion. "Without lead, cars and trucks cannot be made," Mr. Mason said in a letter to Steelman, "and the business of many hundreds of firms making up the whole of automotive production and employing over 500,000 people is threatened with chaotic curtailment and widespread unemployment."

Price, domestic production and import controls over metal operated by different government agencies are keeping potentially adequate supplies off the market, Mr. Mason charged.

New Pension Plan for Dow Midland, Mich.

• • • Employees of Dow Chemical Co., Midland, Mich., will be the beneficiaries of a new pension and profit-sharing plan which was recently approved by stockholders of the company. The plan provides for membership for employees upon reaching the age of 35 after 5 yr of service and for retirement at 65.



Washington . . .

L. W. MOFFETT

• **Mead Committee in catchall move, to ask each big industry what its war profits were . . . Denies witch hunting . . . Lobby legislation puzzles.**



WASHINGTON — It is increasingly evident that the wartime operations of all major industries are to undergo a close scrutiny by the Senate War Investigating Committee. It is not likely, however, that the committee will go into the books and records of big industries until after it is given a new lease on life by the incoming Congress.

This imposes such a task that the committee has no time to open new lines of investigation or "study" in view of pending elections, current investigations into the Canal and Pan-American road-building projects, etc. Also, there looms a change in the make-up of the committee next year, including a change in chairmanship. Sen. James M. Mead, D., N. Y., Committee Chairman, who is said to have been named to the job for the purpose of catapulting him into the political limelight, will not seek reelection but will try for the governorship of New York.

Just prior to his nomination to the state post, Senator Mead named steel as one of the big industries scheduled for "study" by the committee. With its inclusion on the list which had already contained those of the aluminum, automotive, aircraft and ship-

building industries, the field is virtually covered. At least one of the larger firms or corporations in each group would be examined, Senator Mead declared. He did not enlarge on the statement as to which concerns might be selected as the guinea pigs.

INVESTIGATION into the war-time operation of these major industries is not motivated by suspicion of wrong doing, Senator Mead said, but merely represents an attempt to determine the "war profit position" of industry. Thus the committee seeks to slough off cries that, reversing the English Common Law, industry in effect is held to be guilty until it proves its innocence. With such information in hand, so it is contended, it would be possible to plug loopholes in future government contracts and make the country "ready for any emergency." Particular attention would be given to the administration of contract renegotiation and contract termination, it was indicated.

"We would want to determine whether the renegotiation and contract termination procedures permitted the enrichment of people or corporations as a result of war profiteering," Senator Mead told the press.

Charges have been made before the committee by the Comptroller General that "billions were given away on contract terminations." Apparently, this statement was somewhat confusing to the committee in view of the Comptroller General's official report to Congress made three days prior to his appearance before the Mead Committee. In one portion of it had appeared the statement that a "careful analysis of the (contract settlement) methods and procedures . . . has not disclosed any basis for criticism thereof."

This latter opinion was tossed back into Comptroller General Warren's lap through a blistering denial of the charges in a letter to the Mead Committee from H. Chapman Rose, Director of Contract Settlements, who called it to the attention of the committee. In addition, Mr. Rose pointed out that as of the end of the fiscal year,

his office had terminated 316,835 contracts involving \$65.2 billion, leaving to be settled a backlog of 11,680 representing about \$11 billion. All these, Director Rose said, were subject to audit by Warren's office. Out of this tremendous settlement, he said, only about 100 cases have been held up for further investigation concerning indicated irregularities.

THE Mead disclaimer of witch-hunting in the proposed investigation of the bigger industries is all the more interesting in view of a statement in the Committee's fifth report which stated bluntly that operational methods of some corporations and international agreements had hampered the war effort.

"Monopolies in this country by Alcoa in the field of aluminum and Dow in the field of magnesium were definitely a limiting factor in many war production programs," the report said. "Similarly, in international trade, the control of rubber, industrial diamonds, lead, nickel, tin and other important materials impeded the production of many important weapons."

In effect, the report went on to say, domestic sources remained undeveloped because of this situation, leaving the nation with "no alternative sources available . . . because of long-standing cartel control" when the enemy captured our overseas developed sources.

While not very clear as to its exact meaning, another portion of the Mead report would appear to point toward continued or additional governmental controls over industry under the guise of national defense and the institution of a virtual boycott of those who did not cooperate.

"Our anti-trust, patent and other governmental policies should be shaped toward progress of the United States in new fields for the benefit of business and for protection of the country from a national defense standpoint," it said. "These anti-trust and patent policies and the purchase and development work for our armed forces should be coordinated with the purpose of providing adequate protection as well as serving all



Wherever
Basic Steel
is made...

Shown in red on this map are most of the locations in which one or more Ramix hearths have been installed in open hearth and electric furnaces since 1939. Note Key as to number of hearths. At 11 locations, 10 or more Ramix jobs have been put in.

RAMIX HEARTH'S HELP SPEED STEEL PRODUCTION

IN less than ten years, Ramix has revolutionized American hearth-building practice. It has eliminated a traditional, expensive job—the laborious burning-in, layer by layer, of grain magnesite and slag, time consuming, heat consuming, money consuming.

Much of America's war-time steel was poured from Ramix bottoms. A recent count shows that Ramix hearths have been installed in well over 300 open hearth furnaces and in nearly as many electrics. The map above shows most of these locations. In addition there have been uncounted repair jobs with Ramix.

An overwhelming majority of all Ramix hearths ever installed are highly satisfactory and still in use. Experience demonstrates

these four major benefits from use of Ramix:

1. It reduces hearth building time at least 50%, or more.
2. It makes a dense, monolithic hearth, which, either with or without a burned-in dolomite working surface, is highly slag resistant.
3. Ramix hearths show little or no hydration after prolonged shutdowns.
4. Properly installed, a Ramix hearth lasts indefinitely.

Tested and proved in years of the hardest kind of service, Ramix is the economical, dependable refractory for construction and major repair of hearths today. Ramix helped make steel for war and can help you now to speed up production and guard the quality of your steel.



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Exclusive Agents in Canada: REFRACTORIES ENGINEERING AND SUPPLIES, LTD., Hamilton and Montreal

THE IRON AGE, September 12, 1946—87

the other purposes for which such policies are designed.

"Few companies will hesitate to cooperate with the government in such a program when its importance is realized. Where a corporation is desirous of seeking blindly its own dollar gain, it would lose the benefits of participation in the development and technical work for the armed forces."

* * *

MORE than ordinary interest should attend publication of the first issue of the Congressional Record after the new Congress convenes in January. This edition will carry the first officially published list of lobbyists—that varied array of individuals who haunt Washington and the halls of Congress, each attempting in his own way to promote his own or the interests of those he represents by trying to influence legislation.

Bringing lobbying under federal regulation climaxes 10 yr of effort beginning in 1935 when the legislative representatives of the utilities companies were required to register with the Securities Exchange Commission. Since then,

representatives of foreign governments and those of shipbuilding and ship operating interests have been required to register with the appropriate agencies. Now, under the bill passed in the dying days of the 79th Congress, all those seeking to influence legislation in any way must register with Congress.

Enacted as part of S-2177 (Reorganization of Congress), like many other pieces of legislation passed in recent years, the new law presents something of a puzzle to those it is meant to affect. While it is reasonably clear as to its intent and the penalties for violations, it creates much bewilderment as to who is and who is not a lobbyist. Congress failed to make the matter clear by neglecting to define the term.

The lack of a clear-cut definition has presented a problem to Capitol officials who are charged with registration and a large share of the enforcement as well as to the lobbyists. Their appeals for help to the Dept. of Justice have fallen on deaf ears and got them exactly nowhere. Obviously enough, the Department wants nothing to do with rendering a definition of the word for the sim-

ple reason that sooner or later it may be called upon to appear in the courts in connection with violations of the measure; most certainly it would be embarrassing, to say the least, should the defendant be an individual who had declared himself exempt by reason of the Department's own definition.

Generally speaking, it is held to apply to all persons who initiate propaganda intended to sway legislation, to those who get paid for working for pressure groups, and to those business, professional, religious or welfare groups which maintain Washington offices.

Specifically exempt, in addition to those already required to register with another agency, are regularly published newspapers and magazines, public officials acting in their official capacity, and those persons appearing before a Congressional Committee to present their personal opinions (and no more). Registrants must file financial statements every quarter, showing salaries or fees, from whom received, and to whom the amounts were paid out.

A maximum fine of \$5000 or a year in jail or both may be imposed for violation and in addition a 3-yr ban on lobbying activities would apply on conviction. While registrations to date have been slow, the deadline date may be expected to bring a rush of borderline cases to get under the wire.

In the absence of a clear-cut definition of the term "lobbyist," Capitol officials tell their inquirers to make their own decision as to whether they are affected by the law. In addition, they suggest using the following test question: Do you, or does your propaganda, seek to influence legislation?

If the answer to that is yes, then registration is required.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



CPA Grants Priority Aid

Washington

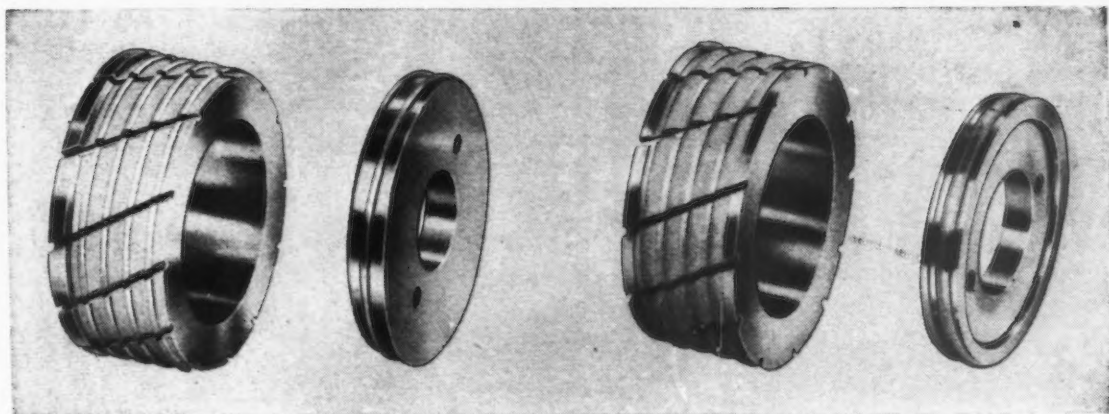
• • • CPA has granted priorities assistance for iron castings and steel for fourth quarter use to manufacture wiring devices specified in Schedule 1 to PR 28, the "bottleneck breaker" regulation. These include such products as sockets, lamp-holders and lamp receptacles. The action results from an interpretation of direction 18 to the regulation.

SHEFFIELD

MACHINE TOOL DATA

MFG #111

CRUSH GRINDING CUTS MANUFACTURING COSTS OF SMALL AND LARGE SCREW CAP FORMING ROLLS



From left to right - (1) Crusher roll for truing the grinding wheel used to produce the internal die; (2) The resultant internal die; (3) Crusher roll for external die; (4) The external die.

The inner and outer rolls or dies used to roll the thread on jar lids have heretofore been made by chasing on a lathe with a tool formed to the desired thread profile. The rolls are then heat treated and polished. Distortion of form occurring in heat treating is a common cause for rejects.

This problem has been eliminated, production time greatly reduced and uniformity of quality assured by the following methods:

(1) Crusher rolls to desired thread profile are made on standard H.S.S. blanks with the Sheffield Micro-Form Grinder.

(2) The resultant crusher roll is used to dress a 120 grit wheel on the Sheffield Precision Thread and Form Grinder

(3) This Sheffield Precision Thread and Form Grinder is then set up to grind the dies in quantity with two passes of the grinding wheel over the work.

While it was possible to produce the form in a single pass at reduced work speed, the most desirable combination of production time and product finish was obtained by taking two passes, one for rough grinding and one for finish grinding.

In grinding, two parts were placed on an arbor. Total grinding time per part was slightly under 4 minutes. Approximately an hour's labor per die is saved by using crush grinding on Sheffield equipment, and the die so produced is more uniform in quality and the finish is better.

Thousands of other production cost problems can be answered satisfactorily by crush grinding with Sheffield equipment. Write for Bulletins M-100-145 and M-120-144.



THE SHEFFIELD CORPORATION

Dayton 1, Ohio, U.S.A.

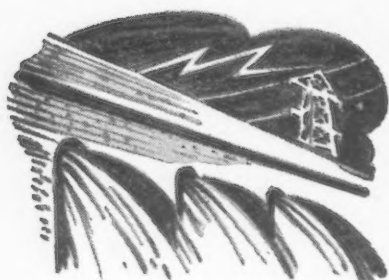
MACHINE TOOLS • GAGES • MEASURING INSTRUMENTS • CONTRACT SERVICES



West Coast

ROBERT T. REINHARDT

• Scrap dearth sends buyers into remote corners hunting odds and ends while millions of tons float on San Francisco Bay... San Diego industry forges ahead.



SAN FRANCISCO — Although steel producers on the West Coast have not as yet had to curtail production because of the scarcity of scrap, most of them have been digging deep into inventories to keep openhearth and electric furnaces operating at near capacity.

With Coast demand from steel producers and foundries running between 130,000 to 150,000 tons per month and deliveries well below those figures, scrap buyers have been scouring every nook and cranny to bring things to a balance. Strangely enough, few buyers are willing to place any part of the responsibility for the shortage on dealers' hopes of getting better prices in the near future.

Principal causes for the lack of the basic material on which the larger part of West Coast steel production is based are given as wartime cleanups; limited industrial scrap; scarcity of agricultural machinery and automotive scrap; and increased demand because of expanded ingot production. The only bright spot seen by purchasing agents takes the form of hundreds of ships tied up in "graveyards" here and in the

northwest, but unless the Maritime Commission soon takes action on the release of some of these ships for shipbreaking, the bright spot is doomed to turn into a cataract.

Local Maritime officials profess to be completely at sea about the possibilities in release of some of the more than 300 ships laid up here, but competent observers state that San Francisco Bay alone is harboring at least one-half million tons of breakable ships now and that within the next 2 yr this "graveyard" could provide at least two million tons of scrap.

CRITICISM has also been leveled at the Army and Navy because of the slowness with which these services have been letting scrap loose, but charges in these directions have been a little more vague than those aimed at the Maritime.

The Pacific Northwest situation has taken a turn for the worse within the past few weeks and ceiling prices prevail whereas a month or two ago there was a free movement at lower prices. This situation is a new one for that section which has always been scrap-rich. Increased postwar consumption over the prewar period is only one factor in the shortage. Shipments from British Columbia to Seattle have practically ceased because of the heavy demand from eastern Canadian ingot producers.

In fact, it is reported that two shiploads of scrap are being brought from Australia to Canada because of the shortage. Other factors are the same as elsewhere including the situation as expressed by one buyer, "The scrap we need is still rolling around the country and our only hope is to fall heir to it when 'junk' cars and obsolete farm machines fall apart because the owners can't get baling wire to hold them together."

Producers of steel in electric furnaces seem hardest hit and some have been forced to limit the sale of the bars and small shapes they roll to tonnages of less than 100 in order to spread production among regular customers.

THE action of the Civilian Production Administration in writing to governors of all states urging that they give support to scrap drives met with immediate response from Governor Earl Warren of California who has written to all state department heads and city and county officials stating, "We can ill afford any interruption of steel production and we urge you to assist in arranging for the collection of iron and steel scrap from corporation yards and other public depositories and its disposition through normal trade channels." The Governor's action was taken only after he had had members of his staff look into the situation and they reported back that conditions were fully as bad or worse than CPA had outlined.

Without the stimulation of wartime fervor it is questionable just how successful "scrap drives" might be if the industry was forced to again go to the man in the street. It seems generally agreed that it would require some skilful promotion—appealing to the self-interest of the housewife wanting a refrigerator and the head of the house thoroughly sick of his antique automobile—to bring out any appreciable quantities of scrap.

When it is widely known that ingot production is hovering around 90 pct of capacity and that ingots are being exported, it is obvious that those outside of the trade aren't likely to get as excited as they did when invasion was a possibility. The recent shipments of ingots to England made by Kaiser Co., Inc., developed some questions from laymen who failed to understand that western finishing facilities lag behind ingot production.

* * *

SAN DIEGO — Conversion to peacetime production has been carried out by almost all war industries here. Since 1941, more than \$3 billion worth of airframes and parts were manufactured in an area formerly noted primarily as a tourist haven and important naval base. The decline in business during the reconversion pe-



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STEEL bars ride down this "roller coaster", travel through an inductor which heats their ends to 2000° F and pass on to an upsetting machine . . . one every 4 seconds. The bars shown here are $\frac{3}{4}$ " diameter, 6" long—heated for a 2" length.

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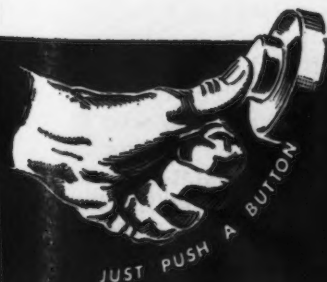
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ried is now leveling off and signs of slight general improvement are apparent. From a wartime peak of 60,000 airframes and parts workers, present manufacturing employment is now close to 7000.

Only two large prime contractors have shut down. Standard Parachute was first to terminate. Concrete Ship Constructors, which once employed 5000 persons, is today using about 50 employees in small Navy ship repair.

Present status of the city's principal industries is reflected in employment of more than double the prewar number of workers. Demand for commercial airplanes, airplane parts (mostly stainless steel manifolds) and a wide variety of durable and consumer goods is creating employment for more than 16,000 persons in manufacturing establishments.

Latest census figures show 361,942 persons, compared with the 1940 figure of 203,341—an increase of 78 pct which is the largest percentage gain for any city in the country, according to local statisticians.

The chamber of commerce study of business conditions, compiled over a 6-month period, shows that 978 new enterprises were established during the first six months of 1946. Expansion is planned by local boatyards with \$2 million earmarked for repair and new shipbuilding facilities. One tuna cannery reports approximately \$3,250,000 worth of tuna clippers under construction.

* * *

CONSOLIDATED Vultee Aircraft Corp. is testing a new roadable airplane designed and developed by T. P. Hall. In 1940 Mr. Hall built and flew an earlier model of his roadable airplane. The new ship is all-metal construction except the wings.

Rohr Aircraft Corp. at Chula Vista, Calif., manufacturers of aircraft manifolds and engine cowlings, reports a backlog of unfilled orders of \$32 million.

Three-wheeled delivery scooters are expected to go into production about Oct. 1 in Building No. 1 of Consolidated Vultee's Plant No. 2, according to Norman T. Firebaugh, president of the Firebaugh Co. Powered by a two-cylinder, 8½ hp motor, the scooter is expected to do 35 mph. Although some equipment has already been moved into

the building, actual production awaits arrival of additional machinery from the East. Three hundred employees will start operations with ultimate employment expected to be approximately 600.

One proposed local development is withdrawing from the area. Bobbi Motor Car Corp., which announced in February plans for the production of a small car to sell in the \$500 to \$600 range, was refused authorization by the California Corporation Commission to issue 650,000 shares of stock without first submitting to a hearing. The hearing date had been set for Aug. 28, but on Aug. 27 the application of the motor car company was withdrawn. The application was filed in June for the sale of stock to the public at \$8.75 per share, and to issue 165,000 promotional shares to S. A. Williams, president of the firm. Mr. Williams has stated that the operation would be moved to Birmingham, Ala.

* * *

LOS ANGELES — Construction of a new plant for fabrication of structural steel and plates was announced by Union Steel Co. The company hopes to turn out 1000 tons of fabricated work per month within the next 90 days in the 102,500 sq ft of space it will occupy, according to A. W. Lewis, president. The 16½-acre tract—is located at Anaheim-Telegraph Road. Fred C. Houghton is vice-president and Pearl Ishan is secretary-treasurer of the 5-yr old organization.

* * *

SEATTLE — Settlement of the wage case of local machinists which has been before an arbitration board marks a definite break in the national wage pattern of an increase of 18½¢ an hr. Increases of from 19 to 40¢ an hr over pay levels at the end of the war are now in effect including increases granted in February.

The new scale approved mandatory wage increases of from 6 to 10 pct over the February scale. Negotiations had been carried on through the Washington Metal Trades, which represents 46 shops in Seattle and western Washington, and it has been estimated that each 1 pct increase granted would cost these employers \$200,000 a year in additional wages. It is reported that this last increase brings the local scale up to equal the high-

est in the country for the trade. H. D. Hailey, employer representative on the arbitration board, dissented on the majority opinion and stated that the decision "constitutes an amazingly flagrant disregard for facts and the record in the case."

Some of the new hourly rates are: tool and die makers, \$1.81—an increase of 16¢ an hr and 40½¢ above the wartime level; journeyman machinists and welders, \$1.51—an increase of 8¢ an hr and 26¢ above the wartime level; specialists \$1.31—an increase of 9¢ an hr and 25¢ above the wartime level; and helpers, \$1.14—an increase of 9¢ an hr and 19¢ above the wartime level.

I. A. Sandvigan, machinists union business agent, termed the new rates "the first major break" in the government's 18½¢ pattern. His union has 2200 members in the 46 shops which employ 8000 men. Mr. Sandvigan expressed the opinion that all the other employees in the shops would also get wage increases corresponding to those given members of his union.

* * *

SALT LAKE CITY — Two main factors — manpower shortages and deferment of development work during the high production war years—are still a heavy drag on the nonferrous metal mining industry. In Utah the current copper production level is 10 to 15 pct under 1939 and more than 30 pct under the 1943 peak. Lead production rate is less than half of either 1939 or the 1943 peak. Zinc is running about 80 pct of 1939 and 40 pct of the 1943 peak.

Common mine labor is becoming easier but skilled miners who can do development work are as scarce as at any time during the war. As a result, long deferred development work is still being pushed into the future.

Some labor improvement is expected as crops are harvested, because a large number of farmers work in the mines during the winter. But this trend is being offset to a large extent by the departure of college students who have been working during the summer.

The Utah Metal Mine Operators' Assn. reports that the industry in Utah is short about 2700 men, or about one-third the normal working force.

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It is reported that

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Bell Telephone Laboratory engineers have demonstrated a "tone synthesizer" that can imitate the sound of any musical instrument.

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Raytheon Mfg. Co. has a compact, rugged radar set for installation on merchant vessels.

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An instrument called a "metal Sorter", made by Control Equipment Co. of Pittsburgh, identifies unknown metals by measuring the electricity they develop when rubbed by a known sample.

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"Liquid Honing", a method of finishing metal surfaces with a spray of emulsion containing an abrasive as fine as 2,500 mesh, is being promoted by Vapor Blast Mfg. Co. of Milwaukee.

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American Steel and Wire Co. has a nail that can be driven into steel with a hammer.

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Plastics can now be dip-dyed at room temperature with solutions perfected by International Printing Ink. The color becomes integral, and the physical properties of the plastic are not changed.

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Oil Well Chemical Service Company of Fort Worth has succeeded, with the help of Monsanto, in sealing oil wells as deep as 11,500 feet with a liquid resin that permeates rock and holds back unwanted natural gas.

A new combination tapping and threading attachment is now available for a leading line of six spindle automatics. The unit has a wide, selective, threading range; it can be mounted in any one or a number of endworking positions, as required, and it can be readily installed or changed over. A descriptive booklet is available.

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Gulf Oil has an additive said to prevent foaming in lubricating oils.

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University of California scientists have produced a standard for the measurement of length ten times as accurate as the cadmium light ray now accepted by using a light wave from transmuted mercury (made from gold) excited by a high frequency radio beam.

The Army and Navy are studying our natural caves, such as Carlsbad and Mammoth, in order to determine their usefulness as war-time shelters for industry.

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Union Oil Co. has "Uniperex", a peroxide made from petroleum for use as a jet plane fuel, to improve diesel fuel oil and as a catalyst in the making of plastics.

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The Ford Motor Company has announced its intention of erecting a \$50 million laboratory for automotive research and engineering.

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"Palestic" is a treatment for plaster which makes it as hard and strong as stone and also makes it adhere to plastics, metal or glass.

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Tennessee Eastman claims that its Tenite plastic pellets blown from an ordinary blasting machine put a fine finish on aluminum castings.

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A TON of Chips every 15 hours



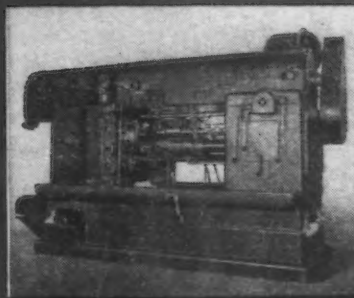
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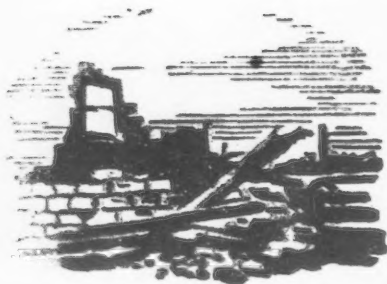
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33

• Plans revised for Steel Control Board... Financial dilemma main factor in delayed new construction... Acute housing shortages cause run on abandoned army camps.



LONDON—The stock market reaction to the announcement of revised plans for a steel controlled board has been to accept it as important evidence that the industry will ultimately remain in private hands. On a trip recently to one of the Midlands heavy engineering production centers, industry executives assured me that within 24 hr of the announcement of the Minister of Supply that the government control board would not concern itself with nationalization, a noticeable flow of orders began to trickle in from long delayed projects.

Just how important the delays are that have been caused by the government's latent threat to nationalize steel is hard to assess. The total amount of new construction that is contemplated is so large, and the arrears of what in normal periods would be routine repair and maintenance added to it, make it difficult to say if all possible speed has been applied in the four months of indecision.

In every firm that is planning a major construction program there is a problem of scheduling the war arrears of normal maintenance and repair against the new building. Supplies of manpower and materials are limited, and careful balancing is required. For these reasons, it is fairly easy for any-

one to demonstrate statistically that, although a firm has not started work on a particular new project, it has been because of the labor shortage, not due to the threat of nationalization.

ALTHOUGH others may take issue with me on the question, I feel sure that there has been considerable holding back, although both government and industry have professed intentions almost monthly of getting on with the work. The plan of the British Iron & Steel Federation for the modernization of the industry calls for a certain amount of new steel capacity above the prewar maximum, but by far the greatest proportion of the funds invested will be to build steel mills and furnaces to replace existing capacity.

This fact brings about the knotty financial problem that is the fundamental cause for the delays that have already occurred. The leaders of the steel industry have available certain reserves which they plan to invest in the new plants, and they have contemplated floating public issues to raise additional funds. If then they invest such funds, they will render obsolete the existing plants. All of this is the normal operating procedure of an industry.

But with the threat of nationalization hanging over their heads, the steel men feel certain that if the government buys the assets of the industry in the future, they will buy only the new shiny plants, and not the old grimy ones. The appropriate government official foresaw financial uncertainties when the nationalization idea was first announced, and assured the industry that every pound spent on modernization would be considered by the government in evaluating the industry, but obviously could give no assurance that he would buy from the steel firms the old shutdown facilities, as well as the new ones.

THIS dilemma has been the essential factor which has delayed the new construction. And as far as any public statements are

concerned, this problem still exists today. True enough, the British Minister of Supply has announced with brave finality that the still unnamed steel control board will not concern itself with nationalization, and therefore the government and the British Iron & Steel Federation have kissed and made up, and now we will really get ahead with the steel modernization plan. But simply getting the British Iron & Steel Federation to agree to sit on the control board does not magically clear up the above financial dilemma, and the control board cannot go on with its work until the financial dilemma is resolved.

Thus the British iron and steel industry started during the war to draw up a plan for the revamping of its mills, and the plan itself was completed not later than last November. But what with the pressing issues of government ownership the basic part of the modernization program, involving considerable new flatrolled capacity, is still in the blueprint stage, and may be on paper only for an indefinite period if past progress is duplicated in the next weeks and months.

There are at least two possible ways of sidestepping the financial dilemma, and it is probable that one of them has already been decided upon, at least tentatively. Some final decision must be arrived at before the new mills go forward, but in view of the distasteful manner in which they may be accepted by certain political factions, the Minister of Supply may well avoid any public utterances on this subject.

The government may decide first of all to give up its idea for nationalizing the steel industry completely, and revert to the status quo. Such a course would involve political dynamite.

A SECOND alternative would be for the government to raise part of the funds for nationalization, and thus gradually acquire a share interest in the various steel firms. This course of action has already been hinted at in the press, and is roughly the course of action that



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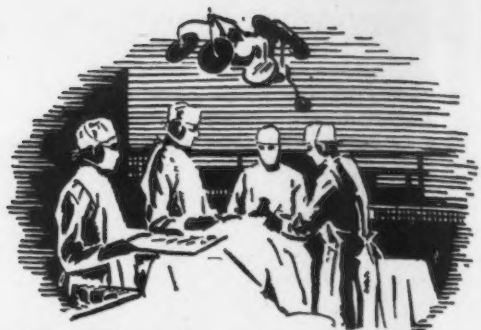
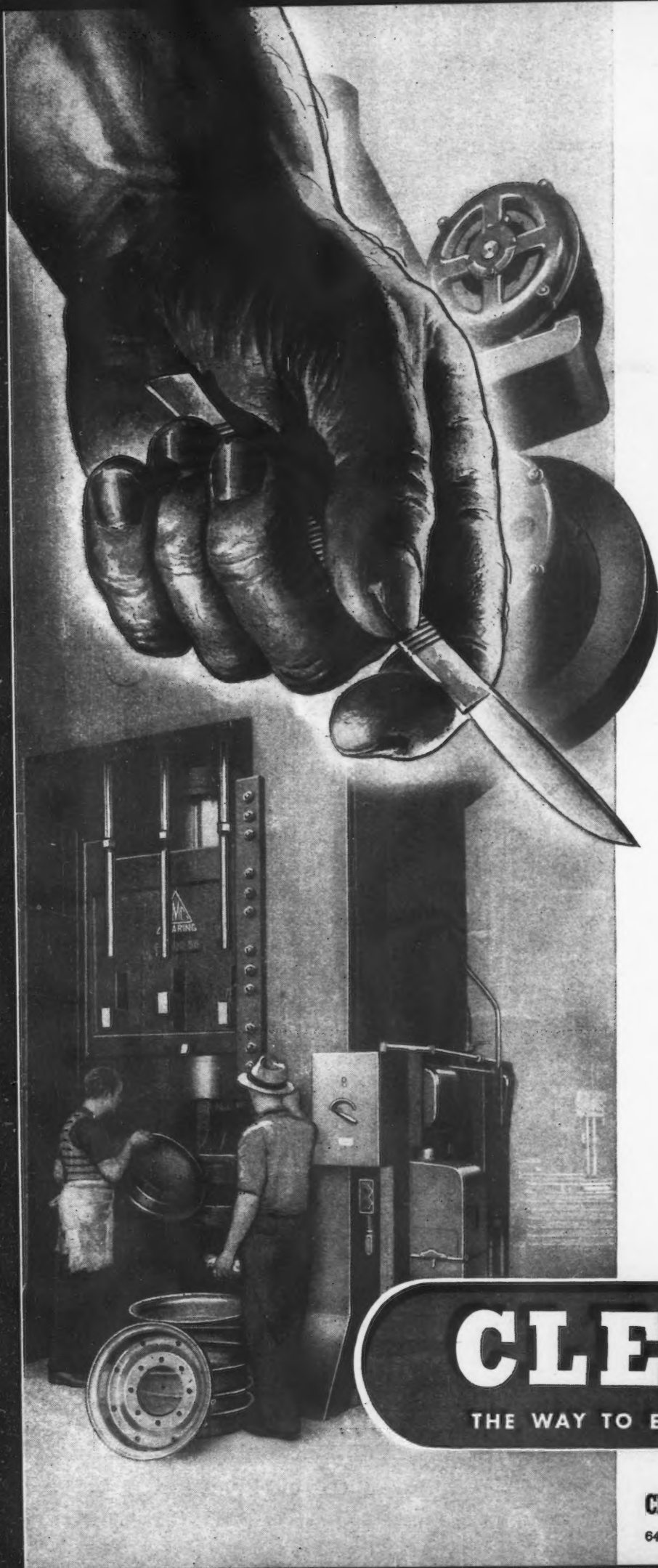
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It is just such an extraordinary combination of qualities, however, which makes possible maximum effectiveness in modern mass production. For producing parts in quantity, speedily and at low cost, the world has yet to find a better means than a *press*. If the parts are to be of significant size, the press must be huge and of tremendous power—yet modern production calls for extreme precision, tolerances incredibly close.

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was followed by the South African Government before the war in acquiring control of the industry there.

It would be possible for the Treasury to decide that in the future the steel industry will not be permitted to float any major fund-raising issues to the public. For example, if the flat-rolled construction program requires \$120 millions, and the firms involved can only furnish \$60 millions from reserves and current profits, the government may simply say, "Fine, and don't worry about the other \$60 millions, we will be glad to furnish them."

If such an action should transpire, it would not be too many years before the government would have a strong voice in the affairs of most of the important firms. It would be theoretically possible for the government to put men on the board of directors of the firms to look out for public interest, but the steel companies would go on under their separate corporate entities with the British Iron & Steel Federation still acting for the group.

The question of the future of the federation remains to be explained to the public, as do so many others. Although the first study of the proposal for the control of the industry would indicate that the federation has passed its day of glory, it is possible that in fact the steel organization is stronger for having gone through this struggle with the government than before.

THE executive and administrative jobs which the federation has been performing will probably continue to be performed, and the men from the federation who find themselves on the control board will be in a strong bargaining position. Their presence is conditional on the Minister of Supply staying in line on these matters, and as federation representatives they will be jealously watching for the government to try to inveigle them to help on nationalization. And as the federation was able to dictate the ground rules for the board, the precedent stands for future dictation by the steel executives.

As time passes the place of G. H. Latham on the control board becomes more certain, in fact it may be officially announced before this story is printed. His presence will tend to guarantee the ultimate

realization of the industry's modernization plan as outlined in *THE IRON AGE* of May 23, 1946, p 114. Mr. Latham will be on the control board as a member of the federation, and he will hardly suggest that the federation's plan be modified. Even stronger, Mr. Latham serves on the British Iron & Steel Federation efficiency committee, whose responsibility it was to draw up the plan. Thus he will be answerable both to his federation and to his committee for modifications that have not been approved in advance by the industry.

* * *

Byproduct of the housing shortage is a new squatter's movement that has spread like a forest fire over all of the United Kingdom. Into countless thousands of abandoned army camps, anti-aircraft huts, airfield posts and other military buildings have moved thousands of families who simply got tired of waiting for the government to do something about housing them.

Taking the law into their own hands they invaded half-occupied camps, defied military guards, tricked corporals into conversations and endless cups of tea while household goods went in through the back door, and dared the government to throw them out. Now almost a month old, the movement has encompassed nearly all of the country, and the government has recognized almost from the beginning that it has on its hands a problem of first importance.

I say almost from the beginning, because the first week or two of the invasions found the various governmental offices frankly in the dark as to what they might do or might have done. The War Office, who was responsible for most of the huts and camps, and who had let them stand idle, was unwilling to call out the troops to forcibly claim its property. The Ministry of Health whose job it is to find houses for the people was reluctant to admit that the huts were in many cases far better than what people were utilizing, and should have forced the hand of the military authorities in releasing the camps for temporary housing. Local government authorities, torn between admitting frankly that they had turned down many camps that had been offered in a fear of future

slums and an immediate need to furnish utilities to the squatters already arrived without encouraging others, made incomprehensible noises and generally waited for national guidance on the issue.

THERE were cases where the local government promptly condemned the new housing sites, and offered the squatters alternative accommodation in the county workhouses, but they were fortunately isolated. The most embarrassing part of the situation was that by the hopeful British standards of what people must have in the bright new world as a minimum living standard, these places are indeed already slums of the worst type.

But it is difficult for the local housing expert to tell a man who has spent his last six winters in one or other army camp or worse that he can't live in one now because it is substandard. Some of the people represented virtual explosions as far as living space was concerned, and the glaring spotlight of transient publicity recalled once more the plight of three and four families living in a single flat, and sometimes in a single room.

After consideration and reflection on the cabinet level, the national government is probably planning to take a liberal view of such proceedings, while at the same time promising to put the heat on the military authorities to release all possible accommodation. Putting the heat on an army is an ambitious job in any country, and although a measure of quiet English revolution has seared the flesh of many a government department in this episode, the probabilities are that the military and the housing experts will mostly just continue to mind their bureaucratic business and thank everyone else to follow their example.

In the meantime the government-sponsored housing drive has reported its July progress with a total of 10,395 temporary and permanent houses completed during the month, and 3467 temporary huts finished in addition. At the end of July there were 163,232 houses under construction and over 100,000 projected but not yet under construction. According to government statistics accommodation has been provided by new building, repairs to war damage, or requisitioning for 202,000 families since April 1945.



HENRY J. WALLACE, general manager of sales, National Tube Co.

• **Henry J. Wallace** has been appointed general manager of sales of U. S. Steel's subsidiary, National Tube Co., Pittsburgh. He succeeds W. F. McConnor who recently was elected National Tube vice-president in charge of sales. Mr. Wallace began with the company in 1928 as a laborer at the Ellwood City, Pa. plant and later was a field engineer in the Pittsburgh Sales Div. Following this, he served in a sales capacity at Indianapolis and Pittsburgh until 1937, at which time he was made manager of sales of the Pittsburgh district office. In 1942, he was named assistant general manager of sales in charge of ordnance, and 3 yr later was appointed sales manager of the eastern area with offices in New York.

• **Victor Voigt** has been named chief engineer of the Bunell Machine & Tool Co., Cleveland. He has been assistant chief engineer in charge of design.

• **Hartley Rowe** has been elected to the board of directors of National Research Corp., Boston. He is a vice-president and chief engineer of United Fruit Co., director of Reed-Prentice Corp., and director of Scott & Williams, Inc.

• **J. Hubert Cuni** has been appointed personnel director of the Lodge & Shipley Machine Tool Co., Cincinnati. Mr. Cuni was associated with Aluminum Industries, Inc. from 1932 until August 1946 with the exception of 3 yr World War II service in the Navy.

PERSONALS

• **Willard G. Hartman** has been elected president, general manager and director of the Lewis Bolt & Nut Co., Minneapolis.

• **William H. Lang** has been named assistant treasurer and credit manager of the eastern area of the Carnegie-Illinois Steel Corp., Pittsburgh. He fills the vacancy caused by the recent death of **Ralph J. Phipps**. Mr. Lang came to Carnegie Steel Co. in 1934 and has been employed in the treasury dept. of Carnegie Steel and its successor Carnegie-Illinois Steel Corp. since that time. In 1943, he was made assistant credit manager for the eastern area, after several previous promotions. Succeeding Mr. Lang in his former position of assistant credit manager, eastern area, is **Orrin E. Barnum** who was promoted from the position of credit representative, Pittsburgh and Cincinnati districts. Mr. Barnum, prior to joining the treasury dept. of Carnegie-Illinois in 1945, had been associated with the Household Finance Corp.

• **Joseph M. Baxter** has been elected treasurer of the Phosphor Bronze Smelting Co., Philadelphia. He comes to Phosphor Bronze after almost 5 yr with the U. S. Army ordnance dept. **Thurston C. Merriman** has been appointed new consulting metallurgist for the Phosphor Bronze Smelting Co. He was a metallurgist with the Seymour Mfg. Co.

• **E. C. Boyce** has been promoted to the position of director of advertising for the Southern States Iron Roofing Co. of Savannah, Ga. Formerly with the mail order dept. of Wilson Sporting Goods Co., New York, and the H. J. Heinz Co. of Long Island City as assistant to the sales manager, Mr. Boyce came to Savannah with Southern States in 1940. He has served as assistant to the vice-president of sales, advertising manager, and until his present promotion, as manager, advertising and mail order sales.



JOHN M. DIEBOLD, head of production engineering dept., Rudolph Wurlitzer Co.

• **John M. Diebold** has been appointed head of the production engineering dept. of the Rudolph Wurlitzer Co., North Tonawanda, N. Y. Mr. Diebold had been associated with the Chrysler Engineering Div. He joined General Motors Truck & Coach Div. engineering staff in 1940 as welding engineer.

• **J. Donald Zaiser**, former executive vice-president and son of the late C. J. Zaiser, has been elected to succeed his father as president of the Ampco Metal, Inc., Milwaukee. He joined Ampco as a member of the production dept. in 1933, was transferred to the field sales dept. in the next year, sales manager in 1938 and general manager last year.

• **H. H. Fairfield** has been appointed to the staff of the H. W. Dietert Co., Detroit, as foundry consultant. Mr. Fairfield has been engaged as a metallurgical engineer with the Physical Metallurgy Research Laboratories of Canada since 1940.

• **Ray Ronald** has been named Western division sales manager of the Hyster Co., Portland, Ore. **Clarence H. Collier, Jr.** has been made the new manager of the Industrial Lift Truck Eastern Div. Mr. Collier has been with the Hyster Co. for many years. He will make his headquarters in Peoria, Ill.



J. C. LEONARD, sales manager, Industrial Marketing Div., Oakite Products, Inc.

• **J. C. Leonard** has been named sales manager of the Industrial Marketing Div. of Oakite Products, Inc., New York. He has been associated with the Oakite organization for over 22 yr, the last 16 yr of which were in the capacity of manager of the company's Chicago div.

• **Robert E. Segerdell** has been appointed office manager of the San Francisco office of Hercules Powder Co. He was formerly assistant office manager of the New York office, and succeeds **Cliff A. Mace**, who will remain in San Francisco until January 1, 1947, when he will be transferred to the Hercules explosives dept. offices in Wilmington, Del. **Thomas E. Brown** has been appointed assistant superintendent of the Bacchus, Utah plant of Hercules Powder Co. He has been associated with the company since 1939 and was dynamite supervisor at the California plant.

• **Ernest S. Theiss** has been appointed assistant chief engineer of the Davey Compressor Co., Kent, Ohio. For the past 7 yr, he has served as assistant professor, mechanical engineering dept., College of Engineering, Duke University.

• **E. L. Jackson** and **M. J. Anderson** have been appointed assistant sales managers for the Air Tool Div. of the Aro Equipment Corp., Bryan, Ohio.

• **Charles Kramer**, district manager of the Waverly plant of U. S. Steel Supply Co., Newark, N. J., has retired. He is succeeded by **William J. Norman**. Mr. Kramer's 46 yr of U. S. Steel service began with Carnegie-Illinois Steel Corp. in Pittsburgh. He has been located at the Waverly plant since 1907 in various capacities, from clerk in the accounting dept. to district manager. Mr. Norman joined U. S. Steel in 1912. In 1939 he became associated with the Waverly plant, where he advanced to the position of assistant district manager, the post he held at the time of his new appointment.

• **Everett G. Ackart**, chief engineer of E. I. du Pont de Nemours & Co., Wilmington, Del., has retired and **Granville M. Read** has been appointed to succeed him. Mr. Read has been assistant chief engineer of the company since 1943.

• **D. Fraser Sullivan** has been elected a member of the board of directors of Graham-Paige Motor Corp., Detroit. He is associated with Michigan Insurance Agency, Dura Div. of Detroit Harvester and Hydro Mfg. Co., Detroit.

• **Frank J. Hughes** has been named sales manager of the Heating & Air Conditioning Div. of Gar Wood Industries, Inc., with headquarters in Detroit. He has been New York district manager of Gar Wood Heating Div. since last November. **W. Gerard Tuttle** has been named director of industrial relations of Gar Wood. He was formerly director of industrial relations of Consolidated-Vultee Aircraft Corp., San Diego division.

• **John S. Slick** has resigned as vice-president and treasurer of the Graham-Paige Motor Corp., Detroit. **J. O. Murray** has been brought to Willow Run from Henry J. Kaiser's shipyards at Portland, Ore.

• **George H. D. Miller**, formerly general factory manager of the Pratt & Whitney Aircraft Div. of United Aircraft Corp., has joined Foote Bros. Gear & Machine Corp., Chicago, as chief manufacturing executive of the company's Precision Gear Div.



KARL W. MUELLER, plant manager, Reading-Pratt & Cady Div., Reading Steel Casting Div. and d'Este Div., American Chain & Cable Co., Inc.

• **Karl W. Mueller** has been appointed plant manager of the Reading-Pratt & Cady Div., Reading Steel Casting Div. and d'Este Div. of American Chain & Cable Co., Inc., at Reading, Pa. He was formerly manager of the Standard Stoker plant at Erie, Pa.

• **A. E. Vallier** has joined the Ford Motor Co., Dearborn, Mich., as assistant to administrative engineer **V. Y. Tallberg**. Mr. Vallier has been associated with Allis-Chalmers in Milwaukee and Ethyl Corp. During the war he was officer in charge of the Lansing regional office of Detroit ordnance district.

• **Harry Keisler** has been appointed vice-president and manager of all operations of the Dulien Steel Products, Inc. of Washington, Seattle. Mr. Keisler has been with the company for about 10 yr. **Gilbert E. Rosenwald** has been appointed assistant manager and assistant secretary. Mr. Rosenwald also has been with the company for several years.

• **J. M. G. Fullman** has retired as general design engineer of National Electric Products Corp., Pittsburgh, after completing more than 33 yr service with the company. He served for more than 10 yr as National Electric works manager and in 1927 was appointed general design engineer.

• **Richard W. Miller** has been appointed district sales manager, Chicago, for the Columbia Tool Steel Co. He started with Columbia in 1929 and was connected with the Cleveland office, sales and warehouse depts. Prior to the new appointment he was assistant manager of the Cleveland division.

• **Philip Goodman**, recently discharged from the service, has been appointed general manager of the Townsco Equipment Co., Oklahoma City.

• **J. J. Friedler, Jr.**, southern district manager of the Ilg Electric Ventilating Co., has been elected to the board of directors. He has been associated with the New Orleans office of the company for over 20 yr. **G. C. Jelliffe**, formerly a lieutenant commander in the U. S. Navy, has been appointed as direct assistant to P. D. Briggs in the New York office. Prior to Mr. Jelliffe's war experience he was Metropolitan division manager of Western Union Telegraph Co. **Keith P. Ribble** has been placed in charge of the Houston office, one of the Southern offices under Mr. Friedler's direction. Mr. Ribble was a representative of Allis-Chalmers Mfg. Co. The Phoenix office is now being operated by **E. B. Bomar**, who has been a sales engineer in that area for several years.



EDWARD C. LOGELIN, JR., whose appointment as director of public relations, U. S. Steel Corp. subsidiaries, Chicago district, was announced in last week's issue of THE IRON AGE.

• **L. A. Hester** has been appointed manager of the Westinghouse Electric Corp.'s Middle Atlantic district's Transportation Div., with headquarters in Philadelphia. **R. F. Moon**, who formerly held this post, has been named special representative. Mr. Hester joined Westinghouse at East Pittsburgh in 1923 and served in various capacities with the transportation branch before his present appointment.

• **Curtis H. Stout**, formerly with Southwest Sales & Service Co., Little Rock, Ark., has been appointed sales representative for the Stearns Magnetic Mfg. Co., Milwaukee, to cover the state of Arkansas.

• **Edward E. Schultz** has been appointed to the engineering staff of the new division, Cook research laboratories, of Cook Electric Co., Chicago. The new division will devote its studies to problems involving industrial processing and instrumentation.

• **Gray L. Furey** has been appointed sales representative for Kentucky, Southwestern Ohio, and Eastern Indiana by the Titan Metal Mfg. Co. His offices are in Cincinnati.

• **Charles R. Yirava** has been appointed factory manager and **J. Elwood Johnson**, chief engineer, of the recently organized Benjamin Reel Products, Inc., Cleveland.

• **Dwight R. Collin** has been appointed personnel director of Mack Mfg. Corp., Long Island City, N. Y. From 1935 until joining Mack, Mr. Collin was associated with the law firm of Chadbourne, Wallace, Parke & Whiteside.

• **Herman J. Kamper**, in charge of quality control studies at the Kearny, N. J. works of the Western Electric Co., has retired after 35 yr of service with the company.

• **John J. Stone**, 59, special products engineer, Bethlehem, Pa. plant, Bethlehem Steel Co., died Aug. 31. Mr. Stone was connected with Bethlehem Steel Co. since 1911 when he was first employed as assistant foreman of treatment, armor plate dept.

• **Harvey J. Thelen**, 36, products manager for the Continental Can Co., New York, and former assistant sales manager of the Steel Package Div. of Geuder, Paeschke & Frey Co., Milwaukee, died recently.

• **John E. Lutz**, 59, treasurer of the Burgess-Manning Corp., Madison, Wis., died Aug. 26. He formerly was purchasing agent for the Burgess Battery Co., Madison, and for the Moline Plow Co. plant at Stoughton, Wis.

...OBITUARY...

• **William H. Vannatta**, assistant comptroller, Bethlehem Steel Corp., Bethlehem, Pa., died Sept. 3. He had been with Bethlehem Steel since 1918.

• **Dr. A. R. Stevenson, Jr.**, 53, staff assistant to General Electric Co.'s vice-president in charge of engineering policy, died suddenly in Schenectady, Aug. 18.

• **Earle F. Sells** died recently following a short illness. He became manager of the Washington office of Westinghouse Electric Corp. in 1932 and 8 yr later was named special government representative for Westinghouse.

• **Philips P. Bourne**, 75, former chief engineer and associated with the Worthington Pump & Machinery Corp., Cambridge, Mass., for 30 yr, died Aug. 26.

• **Frank J. Kaiser**, a salesman for Jones & Laughlin Steel Corp., Pittsburgh, for the last 25 yr, died in Detroit recently.

• **Henry Krohn**, 64, regional director of the Smaller War Plants Corp. and former automobile company executive, died recently in Detroit. He was general sales manager of Paige-Detroit Motor Co. and later became vice-president. He became sales director for Dodge Bros. in 1928 and was also associated with Hupp Motor Car Corp. and Federal Motor Truck Co.

SEE FAIRBANKS-MORSE FIRST FOR SCALES



Fine craftsmanship at Fairbanks-Morse is not only a fact . . . it is a pride, a tradition, a heritage through several generations.

That is why Fairbanks-Morse Scales are a world-wide synonym for enduring accuracy.

But Fairbanks-Morse Scales are more than fine weighing instruments.

They are modern production tools for modern business . . . tools that work carefully and surely to count, to print weight records and receipts, to weigh products while they are in motion.

These things and a multitude more they do in many kinds of business every day.

They'll perform just as faithfully for you.

Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Illinois.

Fairbanks-Morse

A name worth remembering



Diesel Locomotives • Diesel Engines
Scales • Motors • Pumps • Generators
Magnetos • Stokers • Railroad Motor
Cars and Standpipes • Farm Equipment

Dear Editor:

FIRST STEEL CASTINGS

Sir:

I am interested in collecting what data I can on the early steel foundry business. For a number of years I was connected with the Chester Steel Castings Co. This company was organized in 1871; also the Pittsburgh Steel Castings Co. was organized in 1871. Just who started to produce first I do not know, but this is not so important. What seems important to me is did we have any production of steel castings prior to 1871. . . .?

W. T. DUNNING

Philadelphia 3

● As with all "firsts" there are a number of claimants for the honor, but it does appear fairly well established that the first steel castings of commercial interest were produced in Germany about 1851. The first steel castings produced in this country are credited to the Buffalo Steel Co., Buffalo. This company is believed to have produced some railroad castings in 1861. However, first production in this country on an important commercial scale is said to have taken place at the William Butcher Steel Works (now the Midvale Co.) near Philadelphia in 1867. A concise, authoritative summary of the early history of the steel casting industry may be found in the Steel Castings Handbook published by the Steel Founders Society of America.—Ed.

HAMMER BOARD

Sir:

We have a client in Mexico who over the past few years has been purchasing solid maple boards for their 1500 and 2000-lb board drop hammers. These apparently have been giving good service but they now inquire as to whether or not there may be other modern types of hammer boards with advantages and increased life over the solid maple type. Perhaps you might be able to suggest some source of information.

C. M. WARNER

F. H. Crawford & Co., Inc.
New York

● Irwin Mfg. Co., Inc., Garland, Pa., recently announced the introduction of Weld-rock hammer boards. These built-up boards have been used in up to 7500-lb hammers and are said to be free from warpage.—Ed.

FLAME CUTTING

Sir:

In your July 11 issue there is an article "Flame Cutting Stainless Steel," pp. 42-45, in which I am very much interested, and would appreciate if you would send me tear sheets of this article.

J. D. CLOKEY, JR.
General Manager of Sales

Washington Steel Corp.
Washington, Pa.

PIPE FOR ARGENTINA

Sir:

We will thank you very much if you will send a list of manufacturers of standard weight pipe for steam, water or gas in welded quality and seamless. Especially please send the complete address of the manufacturer of Mercer piping.

A. BERNASCONI y CIA.

Buenos Aires
Argentina

● A list of pipe producers is being mailed you. The address of Mercer Tube & Mfg. Co. is 200 Clark St., Sharon, Pa.—Ed.

IRON POWDER PRODUCTION

Sir:

We are interested in the production of powdered iron. Certain byproducts in our plant allow us to produce extremely pure iron oxide similar to the product obtained from the processing of pickling liquor. With the natural gas available at low cost, all factors seem to be favorable for the successful production of high quality powdered iron . . . We would appreciate receiving names of organizations to whom we should apply for information on specifications and the market for this product.

A. L. TER BRAAKE

Tin Processing Corp.
Texas City, Tex.

● Powder metallurgy is certainly a fast developing and highly competitive field. From the iron producer's angle, you may want to contact some of the following who are active in that field: Butler Bros. Co., Cooley, Minn.; Plastic Metals, Inc., Johnstown, Pa.; National Lead Co., 111 Broadway, New York; General Aniline & Film Corp., 270 Park Ave., New York; Metals Refining Co., Hammond, Ind.; Pyron Corp., Niagara Falls, N. Y.; Hardy Metallurgical Co., 420 Lexington Ave., New York; Harshaw Chemical Co., 1945 E. 97th St., Cleveland; Belmont Smelting & Refining Works, Inc., 330 Belmont Ave., Brooklyn; G. S. Mephram Corp., 2001 Lynch Ave., East St. Louis. Metal powder from Swedish sponge iron is being offered by Ekstrand & Tholand, Inc., 441 Lexington Ave., New York. Reference to the semi-annual indexes of this publication will reveal a large number of technical articles covering powder metallurgy, with details on processing methods, markets, etc.—Ed.

POLISHING SILVER PLATE

Sir:

Please send me tear sheets of "New Method of Polishing Silver Plate" which appeared in the June 6 issue.

K. KLIPPHAHN
Chemist

Harvill Corp.
Los Angeles

AMERICAN EXPORTS

Sir:

Some time back we had in our possession your catalog of American exports, 1920 edition. This catalog has been lost and we wonder if you still publish same and if same can be had . . . Though we know that it is still difficult in India to procure a license for importing anything from the U. S., we feel that this restriction will relax as time goes by, and by the time we complete negotiations with a firm in your country we hope that restrictions will be lifted or at least relaxed. We feel that international politics of today will not tolerate any longer any monopolistic type of business by any country with any country . . .

MARRISON & CO.

Calcutta, India

● Publication of the export catalog has been discontinued. However, we are forwarding you a list of other publications dealing exclusively with the export field.—Ed.

KRUPP DRAWING PROCESS

Sir:

In Newsfront, Aug. 15, is an item on "rings for deep-drawing steel cartridge cases." I would appreciate knowing where details of this method can be found.

O. A. GARRICK

Forest Hills, L. I.

● A description of the rings used by Krupp for deep-drawing cartridge cases is available in the 146-page report on various phases of the German iron and steel industry published by the Office of Technical Publications, Dept. of Commerce, Washington 25. It is report No. PB-16720 and the cost is \$10.00 for photostatic copies or \$1.50 in microfilm.—Ed.

ADDRESS WANTED

Sir:

Could you please tell us the address of the Hamilton Art Metal Corp. in New York City.

E. A. DOYLE

135 Munroe St.
Lynn, Mass.

● Their executive office and showroom is located at 230 Fifth Ave. and the office and factory at 314 Broadway, New York.—Ed.

GERMAN CEMENTED CARBIDES

Sir:

About a year ago you had a good article on cemented carbides as used in Germany. We would like to have reprints of this article if possible.

NORMAN PAQUIN
Chief Engineer

Weatherhead Co.
Cleveland 8

● The article you have in mind is probably the article "German Cemented Carbide Industry," which appeared in the Aug. 30, 1945 issue. We are forwarding copies of this article with our compliments.—Ed.

THE NEW ARITHMETIC IN STEEL



Are You Wrestling with Manufacturing Problems? You Can Get *More Products per Ton—Better Products per Ton*—with N-A-X HIGH-TENSILE Steel

Manufacturing experience proves it true: N-A-X HIGH-TENSILE steel enables the average user of hot- and cold-rolled sheets to increase production of units 33% *without* increasing steel consumption.

With this low-alloy, high-tensile steel, less metal is required for each unit. Sections are thinner, yet have *equal* strength and *greater* durability. This saving may well make it possible for you to produce four parts where you normally produce three.

N-A-X HIGH-TENSILE steel can be drawn and formed to intricate shapes. It has excellent weldability, high fatigue- and corrosion-resistance and great impact toughness. These superior qualities bring you not only a better product—but also important economies in handling, fabricating and finishing.

The full extent to which N-A-X HIGH-TENSILE can increase and improve your production depends, of course, on your own particular products and methods. Our metallurgists and engineers will be glad to help you investigate fully.

MAKE A TON OF SHEET STEEL
GO FARTHER

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This Industrial Week . . .

- OPA Scrap Price Action Stuns Industry
- Major Requests of Scrap Trade Refused
- Priority System Still Confuses Market

OPA's action this week in closing the door on a steel scrap price increase for the next six months came as a distinct shock to the scrap industry. While approving advances in cast grades many of the other points in the joint OPA-CPA program were branded as unworkable sops to the trade.

Already there are rumblings in the trade to the effect that since OPA paid little or no attention to the major requests of the scrap industry, the responsibility for getting out the scrap belongs to the OPA and not to the industry. There is a possibility that widespread resignations may be expected from the Scrap Industry Advisory Committee whose recommendations were largely hacked to a shred. The industry had claimed and still claims that increased costs in labor, material and handling made necessary an increase in the steel scrap price ceiling as well as an increase in the spread between the price of unprepared scrap and prepared scrap.

The delay by OPA for a period of two weeks in arriving at a decision on the controversial scrap-price question was apparently due to major differences of opinion between the OPA topside and those in the agency who are closer to the basic scrap problems. While the OPA has cited as its reason for failing to increase the price of steel scrap that it did not want to put a premium on hoarding, a more realistic approach leads to the steel-price question, which is now before the OPA. It is believed that steel sources definitely assured the OPA that if steel scrap prices were advanced, this added cost would be incorporated in data to be submitted to OPA in the industry's request for higher steel prices.

The fact that the scrap industry was bluntly turned down on its major price request suggests the probability that the steel industry's demand for higher steel prices will be closely scrutinized before any final adjustments are made. Furthermore on the basis of OPA's militant price actions, the steel industry may find subsequent steel price increases falling short of its requests. (Turn to p. 116 for OPA action).

WHILE the Civilian Production Administration this week denied that priority ratings would crowd mill order books in the fourth quarter or would result in widespread issuance of rated orders, such assurance had little effect on steel producers in the various steel centers. Contrary to general belief in Washington, priorities already issued for September have created a confusion far outranking wartime days.

While some official sources have claimed that priorities were but a small percent of the total business placed, this view apparently overlooks the effect of such preferential treatment on the production of specific steel products. Some steel companies are not too alarmed over the steel distribution setup, but an even greater number hold the reverse viewpoint.

As an indication of how priorities already have upset steel distribution, one major steel company estimates that its September output earmarked by priorities other than export and hardship cases shows the following percentages carrying priority certification: Steel bars, 16 pct; plates, 9 pct; structural steel, 25 pct; light rails, 12 pct; hot-rolled strip, 10 pct; hot-rolled sheets, 16 pct; cold-rolled sheets, 20 pct; long tines, 26 pct; galvanized sheets, 55 pct; and other products running in the same proportion. A fantastic example with one firm shows that on light gage galvanized sheets certifications have earmarked more than 100 pct of the company's capacity to produce this product. Steel companies point to figures like these as conclusive proof that the CPA has no knowledge of the actual monthly production of each steel product and does not match the priorities it grants against available supplies.

This sharp criticism of CPA from steel centers is expected soon to produce a housecleaning in the method used in the past for granting priority ratings. CPA has already promised that it will be more than difficult for steel users to obtain preferential treatment for their fourth quarter requirements. Nevertheless it is pointed out that the large volume of such ratings already granted will swell to a considerable extent the amount of carryovers representing unshipped tonnage into the fourth quarter of this year and the first quarter of next year.

WHILE the industry grapples with scrap and steel distribution problems it was this week running head-on into a selective shortage of skilled workers. While the volume of semi-skilled workers appears to be adequate, some firms are losing thousands of tons of finished steel a month because certain skilled employees are either unavailable or are leaving the steel industry for other types of work. Industrial relations men claim that some former skilled workers after leaving the army have not returned; others have taken a different type of job, others have migrated to other parts of the country; and some ex-servicemen, dissatisfied with the work, are drawing government unemployment pay.

The steel ingot rate this week staged a spectacular comeback by advancing $2\frac{1}{2}$ points to 89.5 pct from last week's revised rate of 87 pct. A greater flow of scrap is expected this week and consequently an increase in the steel operating rate will probably materialize next week.

One large midwestern steel firm has formally opened its books for the first six months of 1947 and expects by next June to be only about 30 days behind in total commitments. Another large producer will open its books in about 30 days, but the formal opening of order books under present conditions is an empty gesture since all large consumers have been given an idea of what their 1947 quotas will be.

• **AUTO STEEL SET BACK**—While Detroit is not a large producer of housing or agricultural products, a survey of steel suppliers in the Detroit district indicates that steel deliveries will be set back appreciably by the preference being given to CPA certified orders. For an unexplained reason, most certifications seem to be going directly to mills rather than to district offices. One major supplier, however, has disclosed that "a surprisingly large number of orders have been received calling for a very substantial steel tonnage." This is, of course, bad news to automobile builders who are not on preferred lists and who already regard steel as a major bottleneck.

• **TINPLATE**—The easing of the tinplate order, M-21, to permit another 15 pct of output to go into other than sanitary cans, reflects the normal easing of canning requirements in the last quarter. Some mills have scheduled for the last quarter actually less than the 70 pct allocation for sanitary cans, which will mean additional tinplate for other canners. Packers right now are screaming for immediate can shipments, but since the lead time on plate is 2 to 3½ weeks, mill output now would not do them any good. One producer here has a power situation which, coupled with strikes earlier this year, has placed tinplate shipments between 6 and 7 weeks behind schedule. Some electrical equipment needed at this mill has helped delay shipments considerably, and it will probably not be available for at least another month.

• **HEAVY DIRECTIVE TONNAGE**—CPA allocation of 200,000 tons of steel, wanted during fourth quarter for freight car construction, cannot be fully met. One producer reports that at best, only 65 pct of what has been placed in structurals, sheets and bars, can be delivered by Jan. 1. Pipe and miscellaneous items have not been completely ordered. The majority of the sheets needed are 10 to 17 gage and these particular items will be the hardest to fill. A large sheet maker points out that although CPA has said that only 15 pct of all steel tonnage in the country is being allocated, present directives actually control 50 pct of the nation's sheet production.

• **CORRECTION**—On p. 95 THE IRON AGE, Aug. 22, the text showed an order for 250 refrigerator cars placed by Great Northern with Pacific Car & Foundry. This is in error. The order was placed by Northern Pacific.

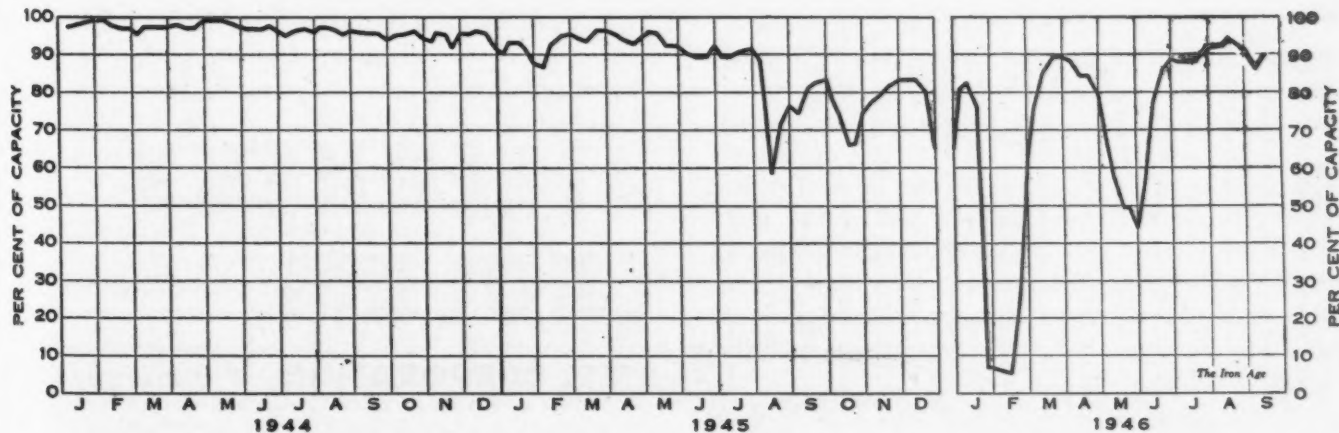
• **DIRECTIVE UNNECESSARY**—One large steel producer in the Chicago area was asked recently for a couple of hundred galvanized sheets, any gage, to repair bad order box cars by a large railroad. The sheets were promptly delivered as unallocated tonnage and without a priority directive. Mills have recognized the railroads' plight and are doing everything possible to help keep the cars rolling.

• **BEHIND IN RAILS**—One large producer of rails in Chicago reports that his fourth quarter deliveries will amount to 68,000 tons of finished rails, which is about one-third of the full capacity of rolling mills. Other mills report total rail production to date is but 40 pct of what they originally planned to make this year. Impact of CPA directives on structurals has hurt rail production on the mills that roll both products. Many of the railroads which are expecting better fourth quarter rail deliveries are going to be disappointed.

• **STEEL EMPLOYMENT**—The iron and steel industry employed an average of 585,100 persons during July, compared with 578,000 in June, according to the American Iron & Steel Institute. That employment average was the highest for any month since December 1943, when 604,730 persons were on the payrolls. During July the total payroll was \$137,988,900, compared with \$125,589,900 in June. Average hours per week of wage earners increased to 36.9 hr in July compared with 34.6 hr in June. Average earnings per hour of hourly piecework and tonnage workers was 135.1¢ per hr in July, against 134.4¢ per hr in June.

• **EMPLOYMENT**—Cleveland industrial employment is at a new peacetime high, 25 pct higher than the prewar peak of August 1929, and substantially above that following VJ-Day. Indicative of the uninterrupted upward trend, 100 plants representing 52 pct of industrial employment in the Cleveland area reported 108,118 workers on their payrolls at the end of August, a gain of 1080 during the month. This compares with 93,833 at the end of August 1945, and 86,160 at the end of August 1929. At the same time, 36 plants predict increases in their employment, 31 plan to continue at current levels, and only two plants face layoffs during the next 30 days. During August, motor vehicle and parts plants increased employment most, showing a 2.2 pct increase for the month.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
September 3....	99.0	77.5	87.5	88.0	84.5*	102.0	95.0	99.0	96.0	71.0*	101.0	75.5	89.0	87.0*
September 10...	100.0	90.5	87.5	88.0	97.0	102.0	95.0	99.0	101.0	68.0	101.5	58.0	94.0	89.5

* Revised.



Another Accomplishment for **A-L SPECIALLOY STEEL SERVICE**

The light-colored central portion of the WAC Corporal, above, is a three-compartment vessel for the rocket's liquid propellents: oxygen in excess of 2000 p.s.i., and red fuming nitric acid and aniline each in excess of 600 p.s.i.

The builders, after engineering and eliminating all the ordinary materials, consulted Allegheny Ludlum for steels with unusual physical properties which could be obtained in the completely fabricated vessel. We made recommendations and backed them with laboratory test and weld data, on the basis of which the engineers made their designs and placed their orders for material: one grade of Allegheny Special Alloy Steel in two thicknesses of flat stock for the higher and lower pressure vessels; another grade of Allegheny Stainless bar stock for fittings; and the necessary stainless wire for welding.

The plates and sheets for the vessels were held to closely controlled analyses in order to favor the ultimate in physical properties, consistent with fabricating demands. Equally important, Allegheny Ludlum research technicians worked closely with the builder in establishing the technique and procedure of

fabrication, heat treatment and hydrostatic test.

The essential points to be made are that the WAC Corporal functioned as planned—and that Allegheny Ludlum Research did, too. Whenever you want steels to do what ordinary materials can't do, in the handling of high pressures, heat, corrosive or erosive influences, etc., call on the Allegheny Ludlum Technical Staff to help you.

ALLEGHENY LUDLUM

STEEL CORPORATION, Pittsburgh, Pa.



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Growing Freight Car Shortage Rushing Towards Climax

Chicago

••• With freight car builders shutting down for lack of materials, the car shortage growing worse and a heavy backlog of foreign freight car orders on the books, the domestic railroad situation is rapidly getting out of control. Entrance by the government, through ODT armed with directives, may come too late to avert what observers here see as one of the greatest car shortages in history. (THE IRON AGE, Aug. 1, 1946, p. 100).

Car builders, who have been hampered by all the strikes and shortages affecting other industries, have been forced to restrict their production to low levels. Although the actual number of domestic freight cars delivered for the first 8 months of 1946, was but 27,703 compared to 32,159 last year, what was built was a feat of unusual proportions, considering all the circumstances. As of Sept. 1 this year, the backlog for all types of freight cars was 56,608 compared to 38,061 last year.

While some carriers have privately criticized the insertion of foreign freight car orders into car-building schedules, car builders insist that this business has been sandwiched in between domestic car production in order to round out mass production methods. Furthermore, it has been argued by car builders that the foreign cars

By D. I. BROWN
Chicago Regional Editor

• • •

have been worked upon while some domestic lines were idle because of material shortages thus retaining skilled manpower for the time when higher operation would be possible.

As of Sept. 1 the backlog of foreign freight cars amounted to 42,715 but it was pointed out that this is equivalent to about 21,000 American freight cars as far as material requirements are concerned. It is significant that during the first 7 months of this year only 4671 foreign cars were delivered.

Further evidence of the growing crises was apparent Aug. 30 when the Pullman-Standard Car Mfg. Co., Chicago plant, announced it would be virtually closed from Sept. 3 to 16 because of the inability to get sufficient steel and other essential materials to produce the needed cars. The shutdown, coming at the very moment when the entire economy of the country is being seriously thrown off balance by the rapidly mounting lack of sufficient freight cars to fill current railroad needs, is the third experienced by this plant in less than 5 months.

Two of the previous shutdowns,

also caused by lack of supplies, resulted in a total loss of 28 working days. According to Arthur A. Logmann, manager of the Chicago works, the plant had originally planned to start Sept. 3 on an order of 755 cars for the Santa Fe. Because of lack of supplies, Mr. Logmann now states, "The earliest they can get under way will be Sept. 16 and then only if the essential materials, expected in the interim, actually arrive on the scene."

The railroads report that they have not withheld placement of orders because of the jammed up condition and low operating rate at the car builders plants. The car builders report they are working on the orders in the sequence received, which includes both domestic and foreign freight car orders. According to some informants, the purchase orders for foreign freight cars carried a penalty clause attached to the construction contract, calling for cancellation unless they were completed within 75 days. ODT has attributed the shutdown of some American manufacturers, because of lack of shipping facilities, to the huge export car building program. An examination of two of the car builders' deliveries in this area, for the first six months of the year, does not substantiate the claim made by ODT and indicates other factors are more to blame.

One large car manufacturer had

on order as of Aug. 1, 8480 domestic freight cars and 11,200 foreign cars. Deliveries made as of July 1, were 4420 domestic freight cars and but 290 cars for export. Of the domestic cars on order, the company reported 3425 hoppers, 850 reefers, 105 ore cars and 2350 box cars. The total requirements for all the plants being operated by this company are 30,000 tons of steel shapes and flat-rolled products, and 8,000,000 board ft of lumber per month to run at capacity. Actual receipts show but 10,000 tons of steel and 2,750,000 board ft of lumber received per month, which has regulated them to one-third their potential producing capacity of 54 cars a day.

Another car builder, as of Aug. 1, reported roughly 4500 domestic freight cars on order and 8000 export cars, 3500 of which were the small four wheel, 20-ton type which require one-half less building time than the domestic cars. The company has delivered, up to Sept. 1 of this year, about 1500 domestic cars and has made none for export. This car builder has been running at one-half capacity all year to date, and aside from shortages in steel and lumber, is having trouble in getting roofs, ends, break beams, etc.

One-wear steel wheel deliveries are extended into the second and third quarter of 1947 and it is stated that this company is five to six months behind in meeting their car deliveries. Total steel requirements for this plant, up to July 1, 1946, was 68,906 tons, 37,143 tons of which was received. The lumber requirements totaled 20,675,000 board ft for the first six months, 3,675,000 board ft of which was earmarked for export car production. The total lumber received over the same period was 9,500,000 board ft delivered to the car building plant, all of which, they report, went into cars for home use.

Obviously, peak carloadings, car shortages and insufficient building materials aren't the proper ingredients for the much needed "highball." Government intervention through priorities, if effected immediately, could not possibly relieve the car shortage before next year. The much talked of 50,000 box cars, which ODT has threatened to build by directives, and which bogged down

partly because of disagreements on financing, won't help the present shortage no matter if the cars are built of aluminum, anodized or otherwise.

The 112 carloads of steel shipped abroad since June 30, to Russia and Yugoslavia, would have been of far greater help in aiding our transportation problems. From a broad overall aspect, it is apparent that the right hand doesn't even know about the left, and there has been absolutely no overall planning in the car building program.

Steel mills, which have been helping the roads by shipping as much tonnage as possible for maintenance work on bad order cars, have stated that if priorities are granted they will insist that the steel be restricted to building of domestic cars. There has been the feeling for some time, that some car builders are taking advantage of the lucrative export business at a time when home needs should come first. Car builders maintain that export orders do not seriously interfere with other construction.

ODT, railroads, and in some cases car builders, have urged priorities for freight car construction for the last several years but no action has been taken. The government, which during the war failed to recognize the plight of the railroads, and has never given the problem the proper attention, is most often the source of the severest criticism. The latest action taken by Colonel Johnson of ODT, who on Aug. 30 called for an Interstate Commerce Commission investigation of the distributing process of freight car production, is both long overdue and ill conceived, as the basic cause lies deeper than mere distribution. Such action, however, is welcomed, it is thought here, as should the shippers of this country suddenly decide, rashly or otherwise, that there is something rotten in the freight car situation, there certainly won't be enough "hot boxes" to go around.

New York

••• Railroad and carbuilding officials here see some similarity between the car shortage which actually exist now and that which threatened to occur many times during wartime days. It is pointed

out here, however, that wartime movement of traffic is considerably different than peacetime shipments.

A large volume of war material moved directed to seaport loading docks and was also handled at specially established cutoff points. During the current peacetime movement of goods short hauls and a tremendous increase in the number of destinations within the country have materialized. Furthermore less than carload lots have expanded tremendously since the end of the war.

All of these factors are additional evidence that this time the car shortage will be real and the crisis serious because of the changed conditions prevailing during a normal peacetime economy. Recent figures indicate that bad order cars approximate 5 pct of the total rolling stock compared with 2.7 pct in 1943. The imposition of additional priorities to alleviate car repair programs may be far from successful when other steel consumers find themselves forced to use pressure in an attempt to gain preferential treatment.

Pittsburgh

••• Freight cars are still a major problem in this area, but during the past week the situation seems to have temporarily eased in specific spots. However, one mill is refusing orders for quick delivery on some items, such as by-products, because box cars are not available for their steel products. The car shortage does not appear to be in any specific type car, but is general.

Hopper cars for moving coal are in extreme short supply, and it was reported this week that coal has been moved recently in gondola cars that happened to be available at the moment. Coal is always a critical item in this area, and consequently constant effort must be made to keep cars available for its movement.

A shortage of gondola cars with wooden floors, desirable where material has to be braced into position, is causing the delay in the shipment of such items as pipe. Other gondola cars, in short supply, have in several instances delayed the movement of scrap.

Mills report that a greater volume of material is moving out by

Shortage of Railroad Cars Retards Production at Geneva Steel

Salt Lake City

• • • Although Geneva steel plant has been moving back into production since its transfer to U. S. Steel Corp. more rapidly than was generally anticipated, it is not yet up to the level justified by orders or personnel. The bottleneck is the lack of railroad cars for both the coal and ore hauls.

A third battery of coke ovens and the third blast furnace could be put into operation at any time if coal and ore could be moved to the plant in sufficient quantities. There is plenty of demand for products of the mill and return of wartime employees has placed the operating company in a good position so far as staff is concerned.

The plate mill was placed on a double turn operation recently. Facilities still idle are two batteries of coke ovens, one blast furnace and six of the nine openhearth. The slab mill is still on a single turn basis.

The hope that sale of the plant to U. S. Steel would entice subsidiary industries into the area are beginning to materialize. Representatives of several companies are quietly looking for plant sites or manufacturing facilities but are saying nothing about plans for fear

of skyrocketing prices for property.

Industrial buildings are practically unobtainable anywhere in central Utah. The Salt Lake chamber of commerce, pressed for helpful suggestions, has been looking with hungry eyes at the Utah Ordnance plant, built during the war for manufacture of small arms ammunition. The plant has been declared surplus but WAA has indicated that it will keep the two largest manufacturing buildings for storage of surplus property for several months.

Bids for the silica brick plant near Geneva will be opened at the WAA offices in Salt Lake City Sept. 12. This plant, built by the government at a cost of about \$600,000 to supply Geneva with furnace relining brick, was operated during the war by Gladding, McBean & Co. WAA anticipates no trouble in finding buyers for it. A dozen prospective bidders are reportedly in the field.

Disposal of the town of Drager-ton, built to house Geneva coal mine workers, may not be so easy, although a couple of interested firms have made inquiries. There are about 600 homes in the town, together with business buildings, theater, hospital, schools, playground and utilities.

truck, but in the majority of instances there are inadequate facilities for the loading of trucks. However, the fact that where heretofore these facilities have at least been satisfactory and now are far from adequate, indicates the increased volume of steel moving by truck from the mills.

Cleveland

• • • Freight car shortages are hampering steel shipments in varying degree in this area. Tinplate has been most affected thus far, because of the tightness of box cars, and open top equipment of all types is running the box car shortage a close second. Arrear-wise, the tightness is most pronounced in Warren, with immediate salvation depending primarily upon quick loading and unloading and subsequent release of the rolling stock.

The biggest difficulty the carriers have faced to date is getting mills and other manufacturers to work unloading crews seven days a week, although most mills have been complying right along. Reliable sources here believe the shortage will continue acute locally at least until the middle of November with the strike at the ports a factor in building up the problem to even greater proportions.

Decontrol of Jobbing Operations Clarified

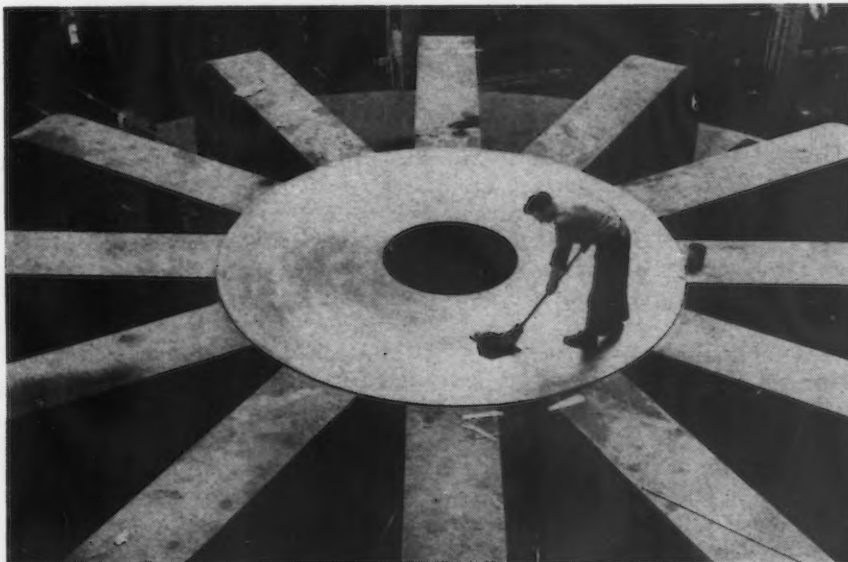
Washington

• • • OPA's decontrol action of July 26 which suspended a number of jobbing operations from price control has been clarified by a second action. Effective Sept. 5, any jobbing shop operation formerly covered by MPR 581 is suspended from price control unless it consists "entirely or principally" of abrading, assembling, cutting, forming, grinding, machining, shaping or welding.

Also, OPA defined the word "principally" as it applies in the order to mean more than 50 pct of the total operation's cost based on the seller's June 30, 1946 maximum price.

All repair and maintenance services under the industrial services regulation are also suspended, regardless of the nature of the work.

BRUSH OFF: One of three 90,000 kva hydroelectric generators for Russia's Dnieper Dam gets the brush-off from a GE worker as it nears completion at Schenectady. Restoration of the damaged Dnieper Dam is expected to be completed in 1948.



NHA Drafting \$8 a Ton Bonus Plan to Step Up Pig Iron Output

Washington

• • • Housing Expediter Wilson W. Wyatt will announce on or about Sept. 15 details of the completed draft of the National Housing Agency's bonus plan by which it hopes to boost production of foundry and malleable grades of merchant pig iron by amounts up to 100,000 gross tons a month.

Bonuses of \$8 a ton will be paid for all foundry and malleable pig produced in excess of established quotas which are expected to total

By KARL RANNELLS

Washington Bureau

• • •

optimistic goal is met. This would be aside from payments for production of new and reopened furnaces.

At the same time, a plan will be revealed by Mr. Wyatt which will provide similar payments as an incentive for opening new furnaces or bringing into blast old

foundry and malleable grades of merchant pig iron.

It was emphasized by Mr. Wyatt that the pig iron program would cover these two grades only since NHA's announced purpose of premium payments is to increase the production of housing materials. Basic, bessemer, high silicon and low phosphorus grades are not eligible.

"In addition to easing considerably the tight situation in respect to many housing items dependent on pig iron—such as soil and pressure pipe, heating and radiation and other equipment," he said, "these increases will enable housing goals to be met and at the same time lessen the impact on other consuming industries."

One of the plants originally considered by NHA as likely for reopening under the plan was the Struthers furnace which has since been leased by the Kaiser interests. Others include the Mystic furnace at Everett, Mass., and the Wheeling Steel Corp. furnace at Martins Ferry, Ohio.

In addition, the agency hopes that the prospect of incentive payments would speed the sale or leasing of surplus plants now held by War Assets Administration at Gadsen, Ala., Daingerfield and Houston, Tex., and at Chester, Pa.

A closed plant is defined by NHA as one in which no blast furnaces were in operation between Jan. 1 and Sept. 1 of this year; a new plant as one operating for the first time after Sept. 1; and an operating plant as one or more blast furnaces producing any product during the first eight months of 1946.

Regardless of the time of the final announcement, payments will be retroactive to Sept. 1, officials said. They will not apply, however, to production prior to but shipped after that date. The incentive or bonus payments would end next June 30 unless a review of the situation next March should result in recommendations for extension of the time.

The industry's advisory com-

Lists Furnaces for Pig Iron Increases

Washington

• • • Production of foundry and malleable grades of pig iron for the first 7 months of 1946 totaled 2,351,000 tons, based on reports submitted to NHA by the 30 operating plants which are expected to produce nearly all the additional output sought by NHA under its proposed bonus plan. These plants and locations are:

Republic Steel Corp., at Troy, N. Y., Cleveland and Thomas, Ala.; Youngstown Sheet & Tube, Hubbard, Ohio and South Chicago, Ill.; Republic-Wickwire, Harriett, Ohio; Ford Motor Co., River Rouge, Mich.; Bethlehem Steel, Bethlehem, Pa.; American Rolling Mill, Ashland, Ky.; American Steel & Wire, Cleveland; Kaiser Corp., Fontana, Calif.; Carnegie-Illinois Steel Corp., Chicago; E & G Brooke, Birdsboro, Pa.; Colorado Fuel &

Iron, Pueblo, Colo.; Inland Steel Co., Indiana Harbor, Ind.; Alan Wood, Swedeland, Pa.; Columbia Steel Co., Geneva, Utah and Provo, Utah; Koppers Corp., Granite City, Ill.; Hanna, Buffalo; Pittsburgh Coke & Chemical, Neville Island, Pa.; Interlake Iron, at Toledo, Ohio; Duluth, Minn.; Erie, Pa., and South Chicago, Ill.; Sloss-Sheffield, Birmingham, Ala.; Tonawanda Iron, North Tonawanda, N. Y.; and Woodward Iron, Woodward, Ala.

Production totals of these plants for 1946 by month were:

January	.....	345,000 tons
February	....	273,000 tons
March	.....	390,000 tons
April	.....	350,000 tons
May	.....	239,000 tons
June	.....	334,000 tons
July	.....	420,000 tons

2,351,000 tons

from 375,000 to 390,000 tons a month. These are forecast on the basis of 1946 production reports submitted to NHA by firms operating the 30 plants which are expected to produce virtually all the expected additional output. For the first seven months of the year, this production totaled more than 2,350,000 tons.

In effect, the incentive bonus payments will be the equivalent of an across-the-board price increase of slightly more than \$1 a ton for the foundry and malleable pig iron industry as a whole, to be paid out of a subsidy which may reach \$800,000 a month if NHA's

ones which for one reason or another have been down. Because of high operating costs and other factors, bonuses for production by reopened furnaces will be higher than for those now in operation. Payments will likely be \$10 a ton or higher. Also because of the varying factors, payments will not be the same amounts but will be established according to individual furnace or area.

The payments will, in effect, amount to a price increase of nearly 30 pct for production in excess of quotas if the present \$28.50 Chicago and Valley ceilings are used as the average prices for

mittee has approved the plan although labor is said to be cool toward it because of a possible adverse effect on the steel industry. This feeling is scouted by NHA which believes that on the contrary it will benefit the integrated plants. The agency also believes that at least one each of the Bethlehem, Youngstown Sheet & Tube, and Republic plants will participate in the plan.

At the same time, some observers believe the program will fall far short of the NHA goal. Agency officials admit privately that ore shortages are a definite drawback; this particularly applies in the Boston and Gadsen areas. Also,

they further concede, the coke and scrap shortages will prove limiting factors.

In order to determine a quota under the plan, an operating plant would use a figure of 80 pct of its highest month's production during the first eight months of 1946 or the average of its three highest months' output, whichever is lower. Since the industry operates on a continuous schedule, all computations would be reduced to a daily basis.

Although the 80 pct figure is somewhat higher than the average monthly production so far this year, it is, however, below the peak production for March and July.

Jessop Completes Big Stainless Clad Order

Washington, Pa.

••• The Jessop Steel Co. here has just completed an order for 700 tons of stainless-clad steel for use in building 44 storage tanks for the Welch Grape Juice Co. Four are being installed at Brocton, N. Y., 9 at Westfield, N. Y., 10 at North East, Pa., 15 at Lawton, Mich., and 6 at Springdale, Ark.

One of the largest orders ever placed with Jessop for stainless-clad steel, the tanks will be used to store 6½ million gal of grape juice. They replace various 5-gal carboys, 50-gal barrels, wooden vats and concrete tanks previously used.

CPA Frees 15 Pct Of All Tinmill Production

Washington

••• An additional 15 pct of tinmill production has been freed by CPA, effective Sept. 30. Only 70 pct of tinplate output must now go into the production of food cans and closures, pharmaceuticals and other essential products, compared with a former restriction requiring 85 pct of tinmill production for such uses.

The action followed a recent recommendation by the Tinplate Industry Advisory Committee to modify the restriction, due to the easing in the supply position, plus the usual seasonal drop in requirements for food containers in the last quarter of the year.

Carl W. Meyers Named As President of CF&I

New York

••• Carl W. Meyers, district manager, Central Alloy Div., Republic Steel Corp., Massillon, Ohio, has left this company after many years association to become president of Colorado Fuel & Iron Corp., Denver. Mr. Meyers will succeed E. Perry Holder, who is leaving the presidency of CF&I because of the pressure of other interests. Mr. Holder will remain as a director of the company.

Machine Tool Maker Builds Earth Mover

Cleveland

••• Delivery of the first "Gradall," a new multi-purpose earth mover manufactured by Warner & Swasey Co., has been announced by Charles J. Stilwell, company president, who said his firm plans to deliver between 45 and 50 of the machines between now and the first of the year, depending upon receipt of materials and equipment to cover this output.

The Gradall, invented by Ray Ferwerda, a Cleveland contractor who has licensed the Warner & Swasey Co. as exclusive builders of the machine, is of all-welded construction and has hydraulic controls. Its 24-ft telescoping boom and control cab are mounted on a turntable which has a swing of 360°. The boom is mounted within a double-ring assembly permitting the entire boom to be tilted 45° in either direction from the horizontal, raised 22° into the air, or lowered as much as 44°.

The unit has a total weight of 16,000 lb, excluding tools, and is mounted on an International Harvester 6-wheel truck chassis. Available are special attachments for digging, trenching, ditch-cleaning, cleanup, or snow removal and scraping, any of which can be interchanged in less than 15 min.

ELECTRONIC PLOUGH: A British inventor has come up with a radio controlled tractor which he claims can plough perfect furrows and execute turns at the will of the radio controller. One man can control six tractors from the radio van, the inventor states.





ORE SHIPMENTS OFF 10 PCT: *The strike of the NMU on the Great Lakes affected ore shipments, no more than 10 pct. Fortunately the supply of ore at the docks and at furnaces had not declined to low levels. Here is an open pit mine in the Mesabi range. The surveyor keeps constant check on operations.*

NEWS OF INDUSTRY

Lake Shipping Strike Seen About 80 Pct Effective

By W. A. LLOYD
Cleveland Regional Editor

Cleveland

• • • Picket lines and propaganda failed to stop the fleet of Great Lakes bulk freighters, and from the standpoint of industry, the CIO-National Maritime Union's effort to halt all shipping on the Great Lakes appears to have been about 10 pct effective.

Throughout the strike, called at 12:01 A.M. Aug. 15, the fleet that brings down from the Lake Superior iron ore district all but a seventh of the total iron ore tonnage consumed by the U. S. steel industry continued to pour cargoes of iron ore into lower lake docks and furnace yards at a rate averaging about 90 pct of normal. Up-bound movement of coal to the industrial centers of the Great Lakes region was even less impaired.

Actual figures of lake-borne tonnages speak for themselves. When all but the last, lone strikebound vessel had regained crews and sailed Sept. 4, the Lake Superior Iron Ore Assn. was able to announce that 9,589,547 gross tons of iron ore had been delivered to U. S. ports on the Great Lakes during August. By comparison, 10,634,896 gross tons were brought down during the preceding strike-free month of July.

From its headquarters here, the Ore & Coal Exchange said the up-bound coal movement for the same 2 months was 7,864,962 tons in July and 8,379,468 tons in August, showing an approximately 7 pct increase despite NMU's interference.

Despite the minor effect of the

strike, a considerable segment of industry watched its progress with more concern than the figures apparently warrant. Labor upheavals in coal-mines, ore mines and railroads this spring already had clipped one end off the normal 32-week shipping on the lakes, making it necessary for the bulk fleet to squeeze into 24 weeks the essential movement of 50,000,000 tons of coal and 60,000,000 tons of iron ore.

When the NMU called its strike, only 8 weeks of the job was done and only 16 weeks remained in which to complete it, before ice

Ore Movement Off

Cleveland

• • • Lake Superior Iron Ore Assn. figures show the 1946 iron ore movement is falling further behind 1945. Cumulative shipments from upper lake ports reached 33,623,281 tons on Sept. 1, down 17,505,391 tons, or 34.2 pct from the Sept. 1, 1945 total. August shipments, usually among the season's highest, amounted to 9,774,442 tons, representing an 8.92 pct decrease from the 10,731,804 tons sent down in August 1945, and 1,073,943 tons less than the July 1946 total, reflecting the National Maritime Union and Canadian steel strikes to some extent. Due to the Canadian steel strike, some of the Canadian ore carriers plied the U. S. trade and Canadian shipments during August amounted to 234,895 tons, a marked increase over the 100,028 tons moved in August of last year.

blocks Great Lakes shipping routes late in November. Pinching off even a small percentage of the bulk fleet's capacity could cause a revision downward both in production schedules and employment in industries based on a lake-borne supply of raw materials.

Partly for that reason, NMU President Joe Curran's strategy in selecting such a moment to call a strike proved unpopular with other unions, particularly the USWA, which refused to give more than lip service, while their affiliated dock workers continued loading and unloading vessels with but slight interruption.

For a while, the Donner Steel dock at Buffalo quit working, but was back in action after 3 days. But the four-element Hulett unloader of the C&P dock here went out of the picture and failed to unload ore carriers again until the afternoon of Sept. 3.

Otherwise, the 69 major dock facilities throughout the Great Lakes ignored the NMU plea for sympathy strikes and continued normal operations—most of them, manned by AFL members, were openly opposed to what they saw in the NMU strike, which was spotted by both the AFL and vessel operators as the spearhead for an organizing drive.

Joseph P. Ryan, president of the International Longshoremen's Union, urged his men to wage "an all-out fight against the communistically controlled NMU," which he said was "about to destroy the AFL on the Lakes."

Since 1937, the NMU has been beaten repeatedly in NLRB elections on various fleets but managed to gain bargaining rights for 53 vessels out of a total of 400 bulk carriers in U. S. registry. Of these,

16 are tankers which struck in short order after Aug. 15. Tanker owners lodged suit against the union "to determine once and for all whether or not negotiations honestly entered into, with a contract signed and delivered to each of the parties, is something to be lived up to by both sides or to be wantonly broken by one at the expense of the other."

As for iron, coal, grain and limestone, over 90 pct of the volume moved annually on the Lakes is carried in the 316 vessels owned by 53 companies comprising the Lake Carriers Assn.

The strength of this fleet, which includes 27 vessels for which the NMU has bargaining rights, ebbed slowly after the strike call to a low point of 85.5 pct, with 46 vessels laid by on the sixth day. Thereafter, crews began putting the strikebound fraction of the fleet back into normal operation.

The Lake Carriers fleet had gained back to nearly 90 pct of its full strength when on Aug. 23 Standard Oil of Indiana, not a member of LCA, signed up its five tankers on compromise terms, calling for a base pay week of 48 hr at sea and 44 hr in port, similar to the NMU's salt water contracts. Shortly after, Bethlehem Steel Co., with 12 vessels, signed on the same terms.

The Lake Carriers Assn. then announced that "in accordance with the long established policy of its members to maintain at all times as high a standard of pay as prevails anywhere in the lake bulk freight trade for similar duties," the minimum wage scale recommended by the association to its members would be adjusted to whatever difference the new pay week might effect. It is presumed by some operators to approximate a 25 pct increase in wages.

Still in the throes of renegotiating contracts for some of the vessels with which it previously held bargaining rights, the NMU issued a "cease fire" order on its strike for noon, Aug. 30.

But picketing and some violence continued. In spite of it, recrewed strikebound vessels gained pace. As of the week ending Sept. 7, the lake-borne movement of raw materials to support the nation's industry again was being pushed to capacity—NMU had won the issue—but lost the strike.

Dept. of Justice Gives Alcoa Final Okay On Cressona Plant Sale

Pittsburgh

••• The last obstacle to the sale of the Cressona Aluminum Extrusion plant to Aluminum Co. of America was eliminated when the Dept. of Justice approved the sale on Aug. 24, but it will be some little time before the company is able to get the facility back into operation. After it was closed down, the equipment was moved out and stored at various depots around the eastern part of the country. This equipment must now all be located and examined to determine whether or not it is serviceable, and then returned to the plant.

I. W. Wilson, vice-president of operation for Alcoa, indicated his belief that partial operations would get under way even before all the equipment was set up. He said that he expected to have die production under way very quickly, and the installation of die-making facilities would be first on the agenda. The die-making facilities of course are for extrusion dies, and there is currently a serious

shortage in this field. New products plus a shortage of skilled die makers contribute to this shortage.

The reinstallation of the equipment for the production of extrusions is expected to consume several months, and it will probably be about 4 or 5 months before full operations are achieved in the plant. Cressona is the largest extrusion plant built during the war by the government, having had a war-rated capacity of 2,900,000 lb of shapes a month and 2,000,000 lb of tube blooms a month. While this may not be an economical rating of capacity for peacetime operations, it is believed that its production will be relatively high when compared with other extrusion plants. Alcoa's plant at Lafayette, Ind., is the only extrusion plant that had a war-rated capacity greater than that at Cressona, and based on capacities at the time of the Truman report in 1944 Alcoa extrusion capacity with Cressona will total about 50 pct of the industry. However, several companies have since either built or announced their intention of building extrusion capacity, and at present no accurate figures are available on this type of product.

SPARE SPARES: Hundreds of rear end assemblies are stacked up a WAA dump at Ft. Devens, Mass., but ex-GI's seeking parts claim that the red tape is piled higher than the automotive assemblies.



Small Denies CPA Will Crowd Books With Rated Orders in Fourth Quarter

Washington

• • • Fears that reinstitution of priorities for iron and steel products during the fourth quarter will result in widespread issuance of rated orders, creating additional confusion on mill schedules, have been termed groundless by CPA Administrator John D. Small.

Mr. Small said this week that ratings for steel will be issued sparingly under CPA's bottleneck breaking regulation, PR 28. Careful screening will be used to limit ratings to cases of extreme hardship, said Mr. Small.

Specific programs, such as those

By GENE HARDY
Washington Bureau

• • •

covering housing and export needs, will require an estimated maximum of 800,000 tons of steel to be delivered on rated orders during the fourth quarter. However, operating officials working with products not covered by these special programs have been instructed to scrutinize all CPA 541-A applications from individual producers so as to weed out all

but the most urgent needs. Government requirements will also be held down because of the cut in Federal construction.

That this policy is being carried out is indicated by reports from Washington trade association executives who have been discouraging their members from applying for ratings for iron or steel on the grounds that "CPA is at present denying nearly all such applications on the basis that a rating will not be required."

Explaining that this seemingly tougher attitude represents no new policy, Mr. Small stated that his basic policy has always been founded on the belief that "priorities breed priorities," and for this reason they must be held to a minimum during the readjustment period. The CPA chief added that he has no intention of allowing any overall priorities system, resembling wartime allocations to take hold.

CPA will give particular attention to requests for priorities assistance from firms attempting to insure delivery of iron or steel not needed for immediate production. For example, at present CPA will deny applications calling for deliveries in the first quarter of 1947 if there is no danger of interrupting production during the fourth quarter. While "insurance policy" orders of this type will be turned down, CPA will give every consideration to requests for aid necessary to prevent immediate production stoppages in any industry.

As to when priorities aid might end, Mr. Small emphasized that CPA expires on March 31, 1947, and that he hoped to taper off CPA activities before that time.

CPA officials expect to see the end of some of the priority programs by the end of the year. This would mean that regardless of the number of programs continued, ratings granted in the fourth quarter for first quarter 1947 delivery will likely spell the end of priorities, unless Congress decides that the emergency powers are to be extended. At this time only one program—the Office of International Trade tinplate export allocation—is sure of continuance into 1947, according to sources outside CPA.

Coming Events

- Sept. 16-20 Instrument Society of America, first conference and exhibit, Pittsburgh.
- Oct. 1-4 Assn. of Iron & Steel Engineers, Iron & Steel Exposition, Cleveland Public Auditorium, Cleveland.
- Oct. 3-4 Magnesium Assn. of America, New York.
- Oct. 3-5 National Electronic Conference, Chicago.
- Oct. 3-5 Society of Automotive Engineers, aeronautic meeting and display, Los Angeles.
- Oct. 9-11 Porcelain Enamel Institute, University of Illinois.
- Oct. 10-12 American Society of Tool Engineers, semi-annual convention, Pittsburgh.
- Oct. 16-19 Electrochemical Society, fall congress, Toronto.
- Oct. 23-26 National Tool & Die Manufacturers Assn., convention, Chicago.
- Oct. 28 American Institute of Steel Construction, annual convention, Coronado, Calif.
- Oct. 28-30 American Gear Manufacturers Assn., semi-annual meeting, Chicago.
- Oct. 29-Nov. 1 Refrigerator Equipment Manufacturers Assn., exposition, Cleveland.
- Nov. 7-8 National Founders Assn., New York.
- Nov. 15-24 National Aircraft Show, first annual exposition, Cleveland.
- Nov. 17-22 American Welding Society, annual meeting, Atlantic City, N. J.
- Nov. 18-22 National Metal Congress and Exposition, Atlantic City, N. J.
- Dec. 2-4 Society of Automotive Engineers, air transport meeting, Chicago.
- Dec. 2-7 National Power Show, New York.
- Dec. 5-7 Electronic Microscope Society of America and American Society for X-ray and Electron Diffraction, joint meeting, Pittsburgh.

Weekly Gallup Polls . . .

Public Presents Pessimistic Viewpoint on Economic Trends

Princeton, N. J.

• • • It's wonderful—but it won't last. That is what the average American thinks about the prosperity that many people say we are now having.

Jobs may be plentiful today and wages higher than before the war. But just wait 5 yr, says John Doe. Then, in his opinion, we are due for a serious business collapse, according to George Gallup, director, American Institute of Public Opinion.

The results of his crystal-gazing into the future are revealed in a coast to coast poll on the possibilities of another depression. The average man and woman not being experts in economic theory, the opinions they express cannot be taken as any sort of business forecast. But they are a good indication of the general economic mood of the country.

The country's attitude was measured on the following question:

"Do you think there will be a serious business depression in the United States within the next 10 yr.?"

The vote:

	Pct
Yes	60
No	20
No opinion	20

All who said "yes" were asked:

"When do you think this depression will come?"

The median average of the replies is five yr.

WHILE it might normally be expected that young people who have not had first hand experience with depressions would be most optimistic about the future, a breakdown of the findings by ages shows the young people more pessimistic, if anything, than the older people.

The vote by groups follows:

Depression Within 10 Yr.?

By Age	Yes Pct	No Pct	No op. Pct
21-29	64	17	19
30-49	59	21	20
50 and over	57	22	21
By Occupation			
Prof. & bus.	63	22	15
Farmers	65	17	18

Depression Within 10 Yr.?

By Age	Yes Pct	No Pct	No op. Pct
White collar	59	23	18
Manual workers..	56	20	24
By Education			
College	70	20	10
High school	64	20	16
Grade or no school	55	20	25

A survey on the same subject was conducted among a cross-section of the prominent Americans who are listed in "Who's Who in America." Among that group, 61 pct said they expected a depression within 10 yr, while 15 pct said they did not, and 24 pct expressed no opinion.

Among this group also, those expecting a depression gave it, on the average, five yr to come.

• • • Here are two facts which political campaigners for Congress or the Senate in the fall may want to note:

(1) Only about one half (49 pct) of the voters in the country today can say what the phrase "balancing the Federal budget" means.

(2) Among those able to say what the phrase means, the vast majority—seven in ten—think it is more important to balance the budget during the coming year than it is to lower income taxes some more.

These findings highlight the problem of political strategists who may want to make "a balanced budget" or further income tax cuts big issues in the fall elections.

The problem appears to be not so much one of convincing the people of the need for a balanced budget as it is of informing a large segment of voters what a balanced budget means in terms of income and spending.

About three out of four among people who have attended college know what balancing the budget means. The figure among high school trained voters is 55 pct.

When, however, the replies of those with a grade school education or less are tabulated, about six in every ten are found with-

Majority, Wary of Present Business Boom, Predict A Serious Collapse in 5 Yr

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out a correct idea of what balancing the Federal budget means.

The questions used in the survey:

(1) "Can you tell me what is meant by 'balancing the Federal budget?'"

The replies:

	Correct Pct	Incorrect (or didn't know) Pct
National	49	51
By Education		
College	77	23
High school	55	45
Grammar or no school	37	63

Results on the second question are limited to those who were able to give a satisfactory answer to the first question:

(2) "Some people say that if we're going to balance the Federal budget we've got to keep income taxes at the present rates. Others say it's more important to cut income taxes than it is to balance the budget. Which do you think is the more important to do in the coming year—balance the budget or cut income taxes?"

The results:

	Favor Balancing Budget Pct	Favor Cutting Tax Pct	No Opin. Pct
National	71	20	9
By Occupations			
Prof. & bus.	78	15	7
Farmers	75	17	8
White collar workers	72	21	7
Manual workers	64	25	11

Leaders in both parties and present administration officials, including Secretary of the Treasury John W. Snyder and President Truman, have emphasized the importance with which they view the need to balance the budget.

Back in the spring, 16 Congressmen issued a joint statement urging Congress to make sufficient cuts to balance the budget. Later, 35 governors throughout the coun-

(CONTINUED ON PAGE 155)

OPA Denies Steel Scrap Price Rise; Bans Tie-Ins; Cast Up \$4

Washington

• • • To halt alleged hoarding by speculators and assure the maximum flow of iron and steel scrap to industry through normal channels, Paul Porter, OPA Administrator, has announced a six-point scrap program that leaves current price ceilings, except for cast iron scrap, unchanged for at least the next 6 months. At the same time, CPA Administrator John D. Small announced plans to speed up scrap deliveries to steel mills by instituting strict inventory controls and through allocating hoarded supplies.

The OPA program to relieve the present acute scrap shortages was termed by Mr. Porter as his "final decision" to end the long controversy over scrap ceiling prices that has virtually halted open trading in scrap.

New CPA regulations to implement the program, will be designed to bring about resumption of normal scrap circulation. It was indicated that the new CPA regulations will require processors of scrap to balance shipments with receipts.

The incentive increase for prepared grades of cast iron scrap which will average slightly less than \$4 per gross ton was the only price increase provided in the program and Mr. Porter made it clear that no general increase in iron and steel scrap prices may be expected.

Other phases of the OPA program are:

1 — Establish ceiling prices for the first time on sales of unprepared scrap to scrap dealers from industrial or government sources. These new ceilings are at the levels as formerly applied to sales of similar materials to consumers or their brokers which will give dealers a basic gross margin of \$3.50 per ton, the difference between the new ceiling prices for unprepared scrap and for No. 1 heavy melting steel.

2—Reduce ceiling prices on sales of unprepared scrap to consumers or their brokers 50¢ a ton, which gives dealers a differential to insure the flow of scrap through this normal channel.

3—Prohibit the purchase or sale of scrap on the condition that the

buyer deliver to the seller any other commodity. Widely practiced by steel mills and manufacturers recently, these "tie-in" sales — the trading of other scarce materials, such as pig iron and new steel, for iron and steel scrap—have slowed down the flow of scrap, diverted it from normal channels and most essential uses, and resulted in dealers hoarding large amounts to increase their trading advantage.

4—Prohibit sale of electric furnace and foundry grades of scrap at premium prices for use in basic openhearth furnaces unless the scrap has been allocated by CPA.

5 — Provide incentive increases ranging from \$2.50 to \$7 per gross ton in the maximum prices for prepared grades of cast iron scrap. Cast scrap totals 11 to 15 pct of the total iron and steel scrap supply, OPA said. The increase should encourage collection of this type of scrap, which may be used to reduce heavy charges as a substitute material for pig iron which is in short supply.

6 — Double OPA's enforcement staff made up of expert graders assigned to scrap and launch a drive for criminal prosecution of violators of OPA scrap regulations.

"My decision that no general increase in ceiling prices of scrap is warranted was reached only after the most careful consideration of all factors involved including the recommendation of the OPA Industry Advisory Committee for scrap that a general increase should be granted," Mr. Porter said. "I want to make it clear, however, that my decision is final and I am relying to a large extent upon the cooperation of the CPA in holding scrap inventories down to legal limits. Any general increase in steel scrap prices would be largely a bonus for speculators.

"OPA's study shows that the committee in recommending the price increase was influenced largely by other considerations than increasing the flow of scrap, such as the practice of trading new steel for scrap. Such trading is now being prohibited. Moreover, the committee's advice was followed in imposing ceilings upon sales of unprepared scrap to dealers and the fixing of a differential between

these sales and those to consumers.

In addition, OPA said that no significant increase in the flow of scrap would result from a general price increase.

The agency explained that bidding up unprepared scrap prices by speculators and those desiring to trade it for new steel has resulted in such high unprepared scrap prices that legitimate margins allowed scrap dealers to cover their preparation costs have been cut greatly and, in some cases, wiped out. In addition to having their margins cut, dealers' volumes have been reduced greatly due to scrap producers and speculators using scrap in direct bargaining for new steel. This action should correct these abuses, the agency stated.

The ban on use of electric furnace and foundry grades by basic openhearth consumers is designed to end a major source of upgrading. It restores a war-time control that was removed soon after V-J Day to permit freer movement of scrap. Since basic openhearts do not require scrap prepared to these specifications their purchase of these grades has led to indirect violation of price ceilings by payment of premiums, OPA said.

Mr. Porter explained that the only increase in ceiling prices granted under the new program is designed to increase the flow of cast iron grades of scrap.

"Resultant increased costs should be more than offset by the increased substitution of scrap for more expensive pig iron," Mr. Porter said. "Cast scrap originates largely from peddlers and automobile graveyards. It is not a byproduct of manufacture and so need not be moved from the premises as must most steel scrap. The price increase should bring out more cast scrap by increasing the small peddler's operating margin.

"Finally, the exercise of inventory controls by CPA is part of the government's program to halt hoarding and correct maldistribution of scrap supplies.

The London **ECONOMIST**

American Prices and OPA

ON JUNE 30, 1946, the Office of Price Administration expired. The wraith of OPA was resurrected 25 days later, and no one is yet very certain how its days on this earth are numbered. The history of the intervening days is by no means clear for all to see. The divergence of statistics from reality during the war period had already been emphasized by last year's wrangle over cost of living and productivity figures in wage disputes. The current guessing game — which might be called "What actually *has* happened to prices?" — is rooted in the same origins. On July 22, the White House released a Dept. of Commerce statement which stressed a 25 pct increase in the Bureau of Labor Statistics index of daily spot market prices of 28 basic commodities during the first 16 days of July. It also noted that if those prices in the index which are in effect set by the government were eliminated, the rise in prices of the remainder, which more clearly reflect market forces, would have shown an increase of almost 35 pct.

In further interpretation of the figures, the statement noted that these increases occurred despite the prospects that OPA controls might be reimposed and that prices might be rolled back to June 30 levels, and it added "This consideration has undoubtedly motivated some of the voluntary 'hold-the-line' agreements which have been widely publicized by industry." The limited extent of the actual "roll-back" is shown by the fact that on Aug. 9 the index was still 20 pct higher than the end-June level.

Needless to say, many groups in the community failed to appreciate this impugning of their motives. Furthermore, the Commerce Dept. had not come into court with completely clean hands in its statistical presentation — although its statement was nicely qualified for the careful reader. Editorial comment was quick to point out that the index showed such a high increase largely because of a freak spurt in

the price of silk, and that the broader wholesale index covering 900 commodities rose by no more than 10 pct in the same period. Changes in wholesale prices take time to filter through to the cost of living of the ultimate consumer, and the latter increased only 5½ pct in the first half of July, although food prices increased 13 pct.

THERE have been further criticisms of the President's statement that "the behavior of prices and rents in the last 4 weeks has given the country a frightening foretaste of what would happen to the cost of living without price and rent control." Part of the increase is more apparent than real, for it amounts merely to the unveiling of federal subsidies for meat and dairy products, which ended with the old OPA. For many commodities, the black market, rather than OPA ceiling prices, represented the real market level before June 30, and current prices are somewhere between the ceiling and black market levels. Finally there are those who point out that in any event some readjustment was inevitable, and that in many cases OPA would have had to recognize it, because of the obvious impossibility of increasing wages in advance of increases in productivity, and at the same time "holding the line" on finished goods prices. The rate of increase in prices was accelerating even before the demise of the OPA, though that did not necessarily imply a continuing upward trend.

Less discussion has centered upon what has happened to rents. More general agreement has existed on the necessity for retaining some form of rent control in view of the acute housing shortage and the impossibility of achieving the requisite increase in housing supply within any short period of time. The National Housing Agency on Aug. 3, however, authorized an increase in rentals on veterans' housing in an attempt to call forth more building. In any event, the rise

Reprinted by special permission to further understanding on how political and economic affairs are viewed in London.

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in prices of raw materials does not have a direct mathematical effect on the price of goods to the final consumer, or, in the case of housing, on rents. For example, construction cost indexes, purporting to show changes of only 40 to 65 pct over 1940 levels are based on quoted prices for building materials and on average hourly earnings. But a major element in today's high cost levels is the difficulty of scheduling operations efficiently because of the uncertain flow of materials. Some go so far as to state that a considerable increase in the price of building materials might actually reduce construction costs if it resulted in adequate, dependable supplies of raw materials.

TO SUM up the current situation, it seems fair to report that the American consumer has weathered the last 30 days with some damage to his pocketbook, but with probably less injury than he anticipated on July 1. But what of the future? On July 25 the President signed the bill restoring emasculated powers to the OPA. A three-man decontrol board has been established whose first task was to decide by Aug. 20 whether certain farm, dairy and petroleum products are to be freed of controls permanently. Subsidies have been reduced. Primary control over farm products has been transferred to the Secretary of Agriculture, an important change because it is reported that Secretary of Agriculture Anderson is in favor of freeing prices more rapidly than OPA Administrator Porter. Other pro-

(CONTINUED ON PAGE 157)

Industrial Briefs...

• **CONSOLIDATES DIVISIONS** — Consolidation of sales development and engineering service divisions of Allegheny Ludlum Steel Corp., under the management of W. B. Pierce, has been announced.

• **ACQUISITION** — The Sheffield Corp., Dayton, Ohio, has purchased the plant, equipment and business of the Threadwell Tap & Die Co., Greenfield, Mass. According to officials of Sheffield, no changes are contemplated at present in the duties or responsibilities at either plant.

• **MOVES BRANCH OFFICE** — The New York branch of the Crucible Steel Co. of America has moved its offices and facilities to 650-652 E. 12 St., New York.

• **STAINLESS FOUNDRY** — A new foundry specializing in corrosion resisting stainless steel castings was due to start production Sept. 1 at Milwaukee. It will be the only foundry in the country devoting all its capacity to the production of corrosion resisting stainless steel castings for the food and chemical industries. The foundry will specialize in low carbon 18-8 stainless steel castings types 304 and 317S, also stabilized types 321 and 347. The new company, Stainless Foundry & Engineering Co., was formed by Harvey W. Kutchera and John McBroom.

• **AMERICAN SCREW MOVES** — Sometime in November, the American Screw Co. of Providence, R. I., will move to its new plant at Willimantic, Conn. The company will continue to operate one plant in Providence. Company officials estimate that the complete changeover to the new plant will take approximately a year to accomplish. At the new plant the company will employ about 500 people to begin with, and expects eventually to employ about 1500.

• **LURIA OPENS BRANCH** — Luria Steel & Trading Corp., New York, has announced the open-

ing of a district office to be located in the Syndicate Bldg., St. Louis. This office will be in charge of Sam Wolff who was formerly associated with the Standard Steel & Rail Co. in St. Louis. Also associated with Mr. Wolff will be J. R. Snelson, who was formerly connected with the Purchasing Dept. of the Granite City Steel Co.

• **ACQUISITION** — Jacob Ziskind, president of Crescent Corp., Fall River, Mass., announces that Crescent Corp. has acquired all the shares of capital stock of the Potter & Johnston Machine Co. of Pawtucket, R. I.

• **FORD OUTPUT UP** — Ford Motor Co. has stepped up production of the Buffalo assembly plant to more than 300 cars a day or 20 pct above the rate in 1942, the last previous year of full output. Employment has been increased to about 2000 compared with 1600 in 1942. The company plans to eventually raise employment at the plant to 3000 or more as materials become available.

• **EXPANDING** — Celotex Corp. of Chicago, has purchased and plans to put into full operation, the asphalt roofing plant located at Madison, Ill., formerly operated by the Barber Asphalt Co. Celotex also recently acquired the Weaver-Wall asphalt roofing and siding plant at Cleveland and the felt mill at Avery, Ohio. The new manufacturing facilities are part of an expansion program in which Celotex plans to increase its capacity for the production of building materials.

• **BUYS KELLY STEEL WORKS** — Commercial Shearing & Stamping Co., has purchased Kelly Steel Works, Inc., one of Chicago's oldest steel fabricating firms, which will be expanded and operated as a wholly-owned subsidiary of Commercial Shearing.

TC&I Embarks on New Construction Program

Birmingham

• • • An extensive new construction program at the Fairfield sheet mill of Tennessee Coal, Iron & Railroad Co., Birmingham, requiring approximately 2 yr for completion, has been announced by Robert Gregg, president of this U. S. Steel subsidiary.

The main objective of the program is to modernize and improve the facilities at Birmingham for the production of sheets through a conversion from the Tennessee company's present hot-rolled method to the cold-reduced method of producing sheets. Another major improvement will be the installation of equipment for the production of galvanized sheet metal in coils, thus making Fairfield one of the few sheet mills in the country capable of providing such material.

Included in this modernization program are the installation of a 54-in. four-high, four-stand cold reduction mill; 48-in. continuous pickling and cleaning lines; two continuous galvanizing lines, one handling material in widths ranging from 20 to 30 in. and the other in widths of 20 to 48 in.; and annealing and shearing facilities of the latest design.

HH Steel Ratings Eased

Washington

• • • Iron and steel building materials orders bearing HH and HHH ratings have been exempted from the emergency suspension order under Dir. 13, PR 1, which, in general, suspended until Sept. 30 all rated orders for iron and steel items except AAA rated orders.

At the same time, CPA amended Schedule A, PR 33, to restore metal window sash and frames to the list of materials for which HH rated orders may be granted.

WAA To Take Plant Bids

Washington

• • • The Chicago WAA regional office will receive sealed bids up to Sept. 19 for the Milwaukee Ordnance Plant, 145-acre Army-owned installation, which is being offered for sale or lease, in whole or in part.

Construction Steel...

New York

••• Fabricated steel awards this week included the following:

- 1300 Tons, Mobile, Ala., building, for Doullut & Ewin, to Ingalls Iron Works, Birmingham.
- 1100 Tons, Worcester, Mass., plant for Norton Co., to American Bridge Co., Pittsburgh.
- 1000 Tons, Bellwood, Ill., manufacturing building, for Chicago Screw Co., to American Bridge Co., Pittsburgh.
- 930 Tons, Mobile, Ala., building for Waterman Steamship Lines, to Ingalls Iron Works, Birmingham.
- 800 Tons, Alexandria, Ind., gypsum manufacturing plant, to Bethlehem Steel Corp., Bethlehem, Pa.
- 650 Tons, Louise, Ariz., spillway gate Davis Dam, U. S. Bureau of Reclamation, to Consolidated Steel Corp., Los Angeles.
- 600 Tons, Odair, Wash., coaster gate Grand Coulee Dam, U. S. Bureau of Reclamation, to Anthony Meyerstein.
- 500 Tons, Natchez, Miss., board mill for Ford, Bacon & Davis, to Ingalls Iron Works, Birmingham.
- 500 Tons, Seattle, hangar, Northwest Airlines, to Pacific Car & Foundry, Seattle.
- 450 Tons, Buffalo, Tudor Plaza apartment building, through Boehm Construction Co., to R. S. McManus Steel Construction Co., Buffalo.
- 425 Tons, East Douglas, Mass., mill for Hayward Woolen Mills, to Bethlehem Steel Co., Bethlehem, Pa.
- 420 Tons, St. Louis, Mo., bridge repair, Missouri, Kansas & Topeka R.R., to American Bridge Co., Pittsburgh.
- 400 Tons, Everett, Mass., sand tanks for General Electric Co. foundry, to A. O. Wilson Structural Co., Cambridge, Mass.
- 395 Tons, Pasadena, Tex., building, Ebasco Services, to Virginia Bridge Co., Roanoke, Va.
- 285 Tons, Ann Arbor, Mich., building for University of Michigan, to Bryant and Betwiler, to American Bridge Co., Pittsburgh.
- 275 Tons, Everett, Mass., manufacturing plant for Monsanto Chemical Corp., to Bethlehem Fabricators, Bethlehem, Pa.
- 150 Tons, Walpole, Mass., boring mill extension for Bird Machine Co., to Providence Steel & Iron Co., Providence, R. I., through Munroe-Langstroth, Inc., Attleboro, Mass., contractors.
- 115 Tons, Coram, Calif., gate hoists and accessories, Shasta Dam, Bureau of Reclamation, Denver, Spec. 1165, to Pacific Coast Engineering Co., Alameda, Calif.
- 100 Tons, Bucksport, Me., bleaching plant for Maine Seaboard Paper Co., to Groisser & Shiager Iron Works, Cambridge, Mass.
- 100 Tons, Newport, N. H., mill addition for Dorr Woolen Co., to Lyons Iron Works, Manchester, N. H.

••• Fabricated steel inquiries this week included the following:

- 3000 Tons, Cleveland, factory building, Perfection Stove Co., Cleveland.
- 2550 Tons, Garrison Dam, North Dakota, bridge Garrison Reservoir, U. S. Government.
- 2400 Tons, Cleveland, factory building, Central Foundry Div. of General Motors Corp., Detroit.
- 1320 Tons, Fort Bragg, Calif., structures at Mitchell and Hare Creeks and Noyo River, California Div. of Highways, Sacramento, Guy F. Atkinson Co., general contractor.
- 1200 Tons, Odair, Wash., trash racks, Grand Coulee Dam, U. S. Bureau of Reclamation, Spec. 1291.
- 375 Tons, Birmingham, bridge across Warrior River, Jefferson County highway engineer. Bids open Sept. 24.
- 100 Tons, Vernon County, Wis., state highway shop.

••• Reinforcing bar awards this week included the following:

- 750 Tons, Kalamazoo, Mich., building for Upjohn Co., to Austin Co., Chicago.
- 300 Tons, Chicago, building for Regnes Teiner Corp., to J. T. Ryerson & Sons, Chicago.
- 135 Tons, Auburn, Ala., two dormitories for Alabama Polytechnic Institute, to Virginia Steel Co., Birmingham.

••• Reinforcing bar inquiries this week included the following:

- 2500 Tons, Chicago, Dearborn subway station, lowest bidder was joint bid by Keywood & Sons Co., and S. A. Healy Co.
- 385 Tons, Fort Bragg, Calif., structures at Mitchell and Hare Creeks and Noyo River, California Div. of Highways, Sacramento, Guy F. Atkinson Co., general contractor.

CPA Will Continue Its Certification Plan; Iron Castings Aid Out Washington

••• Designed to assure the sustained production of housing products and railroad brakeshoes, CPA on Sept. 6 announced continuance over the remainder of the year of the certification plan which aided manufacturers of these products in obtaining pig iron during the third quarter. The revised certification plan, however, has discontinued aid to manufacturers in obtaining iron castings. CPA believes that such assistance can be obtained through the regular procedure of applying for CC ratings under Direction 18 to PR 28.

Farm machinery products have also been eliminated from the fourth quarter certification plan as it was considered that these products are not as critically needed as housing products during the remainder of the year.

These changes were incorporated in an amendment to Direction 13 to order M-21, effective Sept. 30.

CPA also issued simultaneously Direction 16 to PR 3, which prohibits any manufacturer who receives a rated order from his customer from extending this rating to purchase pig iron. Priority assistance for pig iron will be assigned only under Direction 13 to M-21.

Although CPA and NHA have recently announced moves to stim-

110 Tons, Guerneville, Calif., bridge across Russian River, California Div. of Highways, Sacramento, Kiss Crane Co., general contractor.

••• Reinforcing bar inquiries cancelled this week included the following:

- 210 Tons, Evanston, Ill., building for Northwestern University, R. C. Wiebolt, contractor.

••• Plate awards this week included the following:

- 100 Tons, Westboro, Mass., standpipe to Pittsburgh Steel Co., Pittsburgh.

••• Steel sheet piling awards this week included the following:

- 1940 Tons, Long Beach, Calif., bulkheads at Berths 52, 53 and 54, Long Beach Inner Harbor, Spec. HD-221, to Bethlehem Pacific Coast Steel Corp., San Francisco.

ulate pig iron production, through subsidies and reopening idle furnaces, the uncertainty as to when the critical supply situation will be alleviated necessitated a continuance of assistance for the housing program in the fourth quarter, CPA said.

OPA Lifts Controls On 21 Building Materials

Washington

••• Among the 21 additional construction and industrial materials not considered essential to the needs of the Veterans Emergency Housing program which OPA has suspended from price control are the following: Basic refractory brick; fluxing limestone for blast furnaces and open hearth furnaces and for use in smelting copper, gold, lead and zinc and other metallurgical uses; vitreous enamel frit, used in the enameling of iron, steel and clay products; hot tops; industrial sands such as blasting sand and glass melting sand; ladle brick; new dolomite for refractories, for flux stone in blast furnaces and for similar furnace uses; silica brick; blast furnace slag.

These items are covered by a reporting provision which requires that producers report at once to OPA any price change over the June 29, 1946 ceiling. Also any price increase must be reported within 10 days after it has been effected.

MACHINE TOOLS

... News and Market Activities

Sales Below Formula Prices Rumored

••• Whether a rumored regulation authorizing sale of government-owned surplus machine tools at prices below Clayton formula will be issued shortly by War Assets Administration and thus become a reality, is currently the subject of more speculation in the machine tool industry than any government agency move since OPA allowed the price increases.

Already disturbed by the lead, copper and casting shortages, many segments of the industry may likely feel that such a move by WAA is merely another prime example of government agency asininity.

None the less, there are reported plans afoot to sell government-owned surplus machine tools now declared and in inventory, by the end of this year, which to put it mildly would be a rather sizeable undertaking. And while approximately as many tools are being sold from surplus as builders are selling new units, the WAA people probably feel that a reduction in price will expedite the task.

Easily the most problematical fly in the ointment is the question of "long supply," a little anomaly no one on the outside is apparently able to figure out. Some observers have expressed the fear that "long supply" might eventually be construed to mean almost anything, thus adding a little power to the poke in the machine tool industry's ribs which it will receive in the regulation.

Pessimists are already predicting that the market for all standard purpose machine tools will be dried up with issuance of the regulation, and that at a time when new firm orders for machine tools are trending downward slightly, such a regulation would be something of an anticlimax.

Others, perhaps wiser or in less susceptible condition, predict that a dropping of price below Clayton formula will bring out some additional business for a while, and then prospective purchasers will start laying back for another price drop. Another school of thought is

that since the nation's economy is starting to show some unfavorable symptoms, the rumored regulation cannot help but cost the builders business, no matter where they sit.

About two months ago, one of the machine tool industry's expert forecasters predicted that the builders were entering into the period of greatest surplus travail; that was before there was even a whisper about cutting formula prices. The industry's backlog, while hovering around a healthy level by prewar standards, does not show the effect of the price increases. In other words, unit-wise, it's another story. Also, big amounts of foreign business have given the backlog a rounded look in dollars, covering a somewhat lean domestic demand.

New England machine tool builders are doing 25 pct to 50 pct less business than a year ago. Those doing 50 pct less are very few in number, however, and the general drop amounts to 25 pct to not more than 35 pct.

Not many concerns claim to have lost as much as 25 pct through government competition, whereas a large majority maintain they have lost not more than 5 pct. Strange as it may appear, those reporting only 5 pct losses happen to manufacture tools of which the government holds the greatest number. For instance, makers of lathes long familiar to users are apparently suffering very little from government competition, even though it has an abundance of lathes on its hands, and that holds true of grinding equipment.

Losses in their overall business as compared with a year ago are, in many cases, more than compensated by increases in export sales. It is apparent New England builders of tools are very much alive to the possibility of an export market. There are instances where export sales are running in excess of domestic or very nearly so. The largest percentage of export to total business reported is 65.

It is true some concerns are doing little in the export field, presumably because their particular

tools are not as well known and used in foreign countries as are some other lines of equipment. In such instances, export sales are running around 5 pct of total sales. It is the rank and file of the better known tools that are moving in greater volume and their makers claim to have additional business in prospect.

As might be surmised, Russia is by far the best customer, three out of every five exporters doing business with that country. Further, the variety of tools purchased by Russia is quite extensive, whereas most of the other countries confine purchases to one or perhaps two or three types of machine tools.

Other countries buying New England tools include England, France, Sweden, Switzerland and the Netherlands. South America is a very good customer not only for regular well-established lathes, grinders, etc., but for plastic injection molding machines as well. Mexico also is a good customer.

In the Cincinnati area, machine tool builders report that buying, both foreign and domestic, remains at about the same levels. With electrical equipment still in short supply, inventories on some items are piling up.

In Detroit, a new high in competition from surplus sales in the machine tool industry was felt this week when one major supplier learned that 25 of his machines which would ordinarily be drawn from new stock had been supplied from surplus to completely equip a large new industrial plant. As in the case of scrap, the present situation is not enhanced by the fact that price action, while rumored, has not yet been taken. Meanwhile, orders for special tools received by Detroit builders are reported to be steady, while requests for standard machines are somewhat below normal. Some cancellations due to changes in retooling programs have been reported, but the volume of business affected is not large. The present program of builders seems to be to improve equipment as much as possible and thereby add to the attractiveness of the new machines in competition with surplus.

Take a Tip....

FROM THIS DEVILBISS

Fast Action

FINISHING LINE

AT AERONCA AIRCRAFT CORPORATION

There's a valuable lesson in modern product finishing efficiency to be learned from this new streamlined DeVilbiss System, that is geared for high-speed, low-cost production of small fabric-covered aircraft.

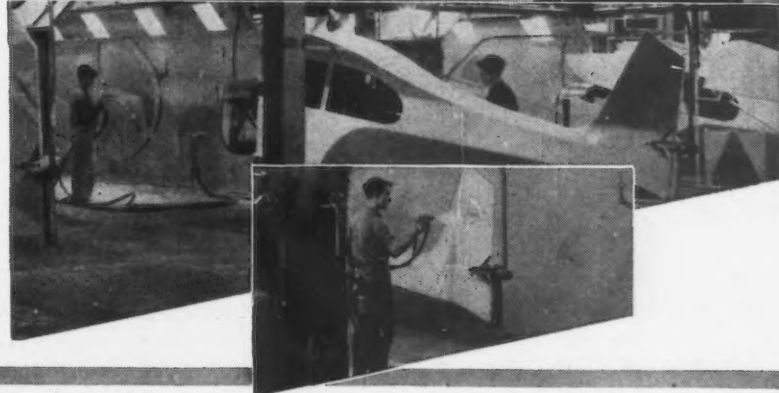
Thirty-eight Champion Trainers are finished daily in the Aeronca dope room and production can be considerably increased without over-taxing present high-speed facilities.

From the DeVilbiss equipment which heats and spray-applies dope at elevated temperatures—to the specially lighted water-wash spray booths, DeVilbiss has contributed greatly to faster, low-cost production. Heavier coatings are possible with a consequent reduction in the number of applications, saving expensive material and labor.

This is another impressive example of DeVilbiss Engineering skill and experience that will improve your finishing operations. Regardless of what your finishing problem may be, if you're not getting maximum speed and high quality finishes at low cost, give your DeVilbiss engineer an opportunity to talk with you.

THE DEVILBISS COMPANY, TOLEDO 1, O.

Canadian Plant: Windsor, Ontario



DEVILBISS

means Quality in all four..



**SPRAY EQUIPMENT
EXHAUST SYSTEMS
AIR COMPRESSORS
HOSE & CONNECTIONS**

NONFERROUS METALS

... News and Market Activities

Crisis Demands Lead Industry Committee

Lead

... In the continuing shortage of lead, CPA is allocating 25 pct of production out of the tonnage required to be set aside by domestic producers. Producers are of necessity required to exercise a form of allocation in distributing the remainder of their production among their customers. Producers are anxiously awaiting the appointment of the industry advisory committee to OPA which had been recommended weeks ago. There has been no action on this by OPA to date although the establishment of the industry committee is necessary before a price increase application can be made. Voluntary price increases can of course be granted by OPA without the benefit of committee action but producers do not expect such a development.

Settlement of most of the major strikes in the industry toward the end of June gave promise of greater secondary, as well as primary, output in the future. It is of interest to note that even the moderate production of secondary lead, as estimated from scrap consumed, exceeded the domestic mine production for the month (25,931 tons secondary against 23,802 tons primary).

Chase Buys Euclid Mill

Waterbury

... The Chase Brass and Copper Co. has announced the purchase of the government-built Euclid Case plant outside Cleveland at a price of \$5,012,522.

As soon as the plant can be equipped for commercial operation, it is expected that all of the sheet brass made by Chase in

Euclid will be manufactured in the newly-acquired plant. Space now used for that purpose in the adjacent Babbitt Road plant will be devoted largely to the manufacture of copper tubing. The two plants will be operated as one unit.

Canadian Aluminum Price Increase Set

London

... As of Sept. 9, the price of aluminum in the form of ingot and notch bars will be increased from £67 to £72 15s a long ton, delivered to United Kingdom consumers' works. The increase is officially ascribed to a rise in the cost of the metal under the Ministry of Supply's Canadian contract consequent on the change in the rate of exchange.

In terms of U. S. currency at the current rate of \$4.03½ per pound Sterling, the delivered price of Canadian aluminum has been increased from 12.07¢ per lb to 13.10¢ per lb.

Mercury

... For a time last week the mercury market which has been stable for a long period dropped to a range of \$97.00 to \$100.00 per flask under the impetus of importation from abroad. Early this week the market stiffened again when the low priced metal had been sold out. Italian and Spanish mercury has been offered at a price of \$80.00 f.o.b. foreign ports which corresponds to a price of \$83.00 delivered eastern U. S. ports plus the \$19.00 duty. This price of \$102.00 has established the domestic market at \$98.00 in large lots, \$99.00 to \$101.00 in small lots.

Output of Canada's Lead and Silver Up

Ottawa

... Canadian lead production in June totaled 15,464 short tons, as compared with 15,025 tons in May and 12,588 tons in June 1945. Production for the first six months totaled 93,837 tons, compared with 82,138 tons for the first six months of last year.

Production of zinc in June declined to 19,631 tons, from 20,452 tons in May and 21,735 tons in June 1945. Output for the first half of this year amounted to 34,230 tons against 53,239 tons for the corresponding period of 1945.

Canadian output of silver rose to 1,174,600 fine ounces in June compared with 1,037,921 oz in the previous month and 1,099,541 oz in June 1945. Aggregate output of silver for the first six months of this year was 6,680,213 oz compared with 6,523,556 oz in the same period of last year.

Zinc

... Producers were momentarily expecting to hear from OPA at the beginning of this week whether or not OPA would act voluntarily to increase the price of zinc. They are hoping that some affirmative action may be taken in the matter. However, since the OPA authorized the sale abroad at world prices of zinc refined domestically from foreign ores a large volume of export business has developed. This has served to restrict further the supply of the metal which before had been in fair supply although badly unbalanced in inventories of certain grades. In exporting zinc at world prices, producers get back their drawback and in addition receive a premium price.

July stockpile figures were:

	July 31	June 30
	tons	tons
Prime Western	40,554	51,998
Brass Special	15,084	15,084
Intermediate	5,595	5,595
High Grade	144,146	146,550
Special High Grade	1,200	2,800
Total	206,579	222,027

Nonferrous Metals Prices

Cents per pound

	Sept. 4	Sept. 5	Sept. 6	Sept. 7	Sept. 9	Sept. 10
Copper, electro., Conn.	14.375	14.375	14.375	14.375	14.375	14.375
Copper, Lake, Conn.	14.375	14.375	14.375	14.375	14.375	14.375
Tin, Straits, New York	52.00	52.00	52.00	...	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25	8.25	8.25
Lead, St. Louis	8.10	8.10	8.10	8.10	8.10	8.10

NONFERROUS PRICES

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	30.00
Cadmium, del'd	11.25
Cobalt, 97-99% (per lb)	1.50 to 1.57
Copper, electro, Conn. Valley	14.375
Copper, electro, New York	14.125
Copper, lake, Conn. Valley	14.375
Gold, U. S. Treas., dollars per oz.	35.00
Indium, 99.8%, dollars per troy oz.	2.25
Iridium, dollars per troy oz.	125.00
Lead, St. Louis	8.10
Lead, New York	8.25
Magnesium, 99.9 + %, carlots.	20.50
Magnesium, 12-in. sticks, carlots.	27.50
Mercury, dollars per 76-lb flask, f.o.b. New York	\$99 to \$101
Nickel, electro, f.o.b. refinery	35.00
Palladium, dollars per troy oz.	324.00
Platinum, dollars per troy oz.	333.00
Silver, New York, cents per oz.	90.125
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.69
Zirconium copper, 6 pct Zr, per lb contained Zr	\$ 6.00

Remelted Metals

(Cents per lb)

Aluminum, No. 12 Fdy. (No. 2)	13.25 to 13.50
Aluminum, deoxidizing	
No. 2	13.50
No. 3	12.50
No. 4	12.00
Brass Ingot—celling prices	
85-5-5-5 (No. 115)	15.75
88-10-2 (No. 215)	19.00
80-10-10 (No. 305)	18.50
No. 1 Yellow (No. 405)	12.75

Copper, Copper Base Alloys

(Mill base, cents per lb)

	Extruded shapes	Rods	Sheets
Copper	25.66	25.31	25.31
Copper, H.R.	22.16	22.16	22.16
Copper drawn	23.16	23.16	23.16
Low brass, 80%	24.35	24.66	24.66
High brass	24.35	23.67	23.67
Red brass, 85%	24.67	24.98	24.98
Naval brass	23.84	22.59	22.59
Brass, free cut	18.53	18.53	18.53
Commercial, bronze	25.50	25.81	25.81
Manganese bronze	27.45	25.95	32.03
Phosphor bronze, A, B, 5%	43.70	43.45	43.45
Muntz metal	23.59	22.34	26.73
Everdur, Herculey, Olympic or equal.	29.82	30.38	30.38
Nickel silver, 5%	34.44	32.38	32.38
Architectural bronze. 22.50	22.50	22.50	22.50

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb and over.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb and over.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4: 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 52S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 27.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. Rod: 2S, 3S, 1¼ to 2½ in.

(Continued, See Next Column)

diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. Round Wire: drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢; B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

NONFERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	11.50
No. 1 tinned copper wire, No. 1 tinned heavy copper	11.50
No. 2 wire, mixed heavy copper	10.50
Copper tuyeres	10.50
Light copper	9.50
Copper borings, No. 1	11.50
No. 2 copper borings	10.50
Lead covered copper wire, cable. ....	.....
Lead covered telephone, power cable .....	.....
Insulated copper .....	.....

OPA Group 2†

Bell metal	17.25
High grade bronze gears	15.00
High grade bronze solids .....	.....
Low lead bronze borings .....	.....
Babbitt lined brass bushings	14.75
High lead bronze solids .....	.....
High lead bronze borings .....	.....
Red trolley wheels	12.50
Tinny (phosphor bronze) borings.	12.25
Tinny (phosphor bronze) solids.	12.25
Copper-nickel solids and borings.	11.00
Bronze paper mill wire cloth	11.25
Aluminum bronze solids	10.75
Soft red brass (No. 1 composition) ..	10.75
Soft red brass borings (No. 1)	10.75
Gilding metal turnings	10.25
Contaminated gilded metal solids.	10.25
Unlined standard red car boxes.	10.00
Lined standard red car boxes.	9.50
Cocks and faucets	9.50
Mixed brass screens	9.50
Red brass breakage	9.25
Old nickel silver solids	7.60
Old nickel silver borings	7.50
Copper lead solids, borings	6.75
Yellow brass castings	7.50
Automobile radiators	8.75
Zincy bronze solids, borings	9.75

OPA Group 3†

Fired rifle shells	9.50
Brass pipe	8.75
Old rolled brass	8.25
Admiralty condenser tubes	8.75
Muntz metal condenser tubes	8.25
Plated brass sheet, pipe reflectors ..	7.75
Manganese bronze solids	8.00 ¹
Manganese bronze solids	7.00 ²
Manganese bronze borings	7.25

OPA Group 4†

Refinery brass	6.00*
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*Price varies with analysis. ¹Lead content 0.00 to 0.40 pct. ²Lead content 0.41 to 1.00 pct.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb or more, 46¢ a lb; 25 to 90 lb, 56¢; less than 25 lb, 66¢.

Brass Mill Scrap†

Briquetted cartridge brass turnings	10.375
Cartridge brass turnings, loose.	9.625
Loose yellow brass trimmings.	9.625

Aluminum

Plant scrap, segregated

2S solids	8.50 to 9.00
Dural alloys, solids 14, 17, 18, 24S, 25S	6.00 to 6.25
turnings, dry basis	1.50 to 1.75
Low copper, alloys 51, 52, 61, 63S solids	8.00 to 8.50
turnings, dry basis	5.00 to 6.50

Plant scrap, mixed

Solids	4.25 to 4.50
Turnings, dry basis	1.50 to 1.75

Obsolete scrap

Pure cable	6.50 to 7.50
Old sheet and utensils	5.00 to 5.50
Old castings and forgings	5.00 to 5.50
Pistons, free of struts	4.00 to 4.50
Pistons, with struts	2.50 to 3.00
Old alloy sheet	2.00 to 2.50

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt Borings and turnings	1.50
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Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings.	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings ...	7.50
Engravers, lithographers plates ...	7.50
Old zinc scrap	5.75
Unswaged zinc dross	6.00
Die cast slab	5.50
New die cast scrap	5.45
Radiator grilles, old and new	4.50
Old die cast scrap	4.00

Lead

Deduct 1.40¢ a lb from refined metal basing point prices for refinery charge on used battery plates.

Soft lead scrap

Nickel

Ni content 98+%, Cu under ¼%, 23¢ per lb; 90 to 98% Ni, 23¢ per lb contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt allowed	
Cast, oval, 15 in. or longer	29.75
Electrodeposited	23.47
Rolled, oval, straight, delivered.	23.72
Curved, 18 in. or longer, delivered ..	23.72
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	27.25
Zinc, cast, 99.99, 15 in. or longer.	17½
Nickel, 99 pct plus, frt allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.	95%

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 1-5 bbls	34.00
Copper sulphate, 99.5, crystals, bbls	7.75
Nickel salts, single, 425 lb bbls, frt allowed	13.50
Silver cyanide, 100 oz lots, per oz.	0.749
Sodium cyanide, 96 pct, domestic, 125 lb drums	15.00
Zinc cyanide, 100 lb drums	33.00
Zinc sulphate, 89 pct, crystals, bbls, frt allowed	6.35

SCRAP

... News and Market Activities

OPA Price Turn-Down Shocks Industry

New York

... OPA's action this week in closing the door on a steel scrap price increase for the next 6 months came as a distinct shock to the scrap industry. While approving of the advances in cast grades many of the other points in the joint OPA-CPA program were branded as unworkable sops to the trade.

Observers here expected widespread resignations from the Scrap Industry Committee whose recommendations were largely hacked to a shred. It is reported that approximately 75 pct of normal scrap shipments are in the steel grades and it is doubted if imposition of an unprepared scrap

See p. 116 for details of the new OPA scrap plan.

ceiling alone can increase the present low level of these shipments over an extended period of time.

Approximately 20 pct of scrap shipments are in the cast grades and the incentive plan will, it is believed, help considerably in bringing out extra quantities of this material, which has not been hoarded to any extent, and much of which must be picked up by the small collector.

Steel scrap, withheld pending the announcement, must of necessity begin to move though it is doubtful if the volume involved will have a beneficial effect for more than a month or so, by which time it is apparently hoped that production scrap will be generated in better volume.

Trade sources claim that prevention of tie-in sales, or earmarking of scrap, will be difficult to enforce because the practice is an old and legitimate one. Though not formerly practiced as widely as it is today there will be a problem in knowing where to draw the line.

PITTSBURGH—Scrap shipments have been declining daily, with one dealer estimating present tonnages at about 50 pct of those 60 days prior to the beginning of the present price controversy. Rail-

roads and automobile manufacturers are carefully distributing their own scrap to mills. Some electric furnace operators, especially foundry activities, are on the verge of shutdowns. OPA's recent activities cut down considerably the overgrading, and car rejections are now fairly low. Typical of receipts of scrap, one company reported that over a 3-day period, scrap shipments dropped 66 pct.

CHICAGO—Scrap continued to move here despite uncertainties of price prevailing during the past week. The Labor Day curtailment was confined mostly to finishing departments and the only plants which discontinued melting were those where scrap inventories are nil. It is significant that one large independent mill reported better than usual scrap shipments last week.

PHILADELPHIA—Dealers here predict that definite OPA action will not result in a large volume of scrap shipments because the yards, with certain exceptions, are not reported to have accumulated significant tonnages during recent weeks. This information is contrary to what has been the impression of some mill officials. It is reported here that scrap has been moving in volume from eastern districts to Pittsburgh during the recent period of price uncertainty and that yard inventories here reflect the operation. Mill inventories in eastern Pennsylvania are said to be nearing the vanishing point.

DETROIT—Channeled or earmarked production scrap is moving here where freight cars are available, but otherwise the market is virtually at a standstill—as it has been for some time while waiting for the OPA scrap price decision. An increasing tendency is noted here for large producers such as Ford, Chrysler and GM to utilize their own scrap to as great an extent as possible.

BIRMINGHAM—Scrap available to consumers here shows no sign of increasing in volume and stockpiles continue to be reduced daily. Little industrial scrap is being offered and farmers are more inclined to concentrate on crops than they are to collect agricultural scrap at the price it brings.

BUFFALO—Mill stockpiles were further decimated during the past week while the OPA weighed the question of higher prices and yards marked time. Opinion here, as elsewhere, was sharply divided regarding the effect of no price advance. One leading dealer predicted that announcement of the agency's decision would bring a rush of shipments for a few weeks, followed by a slump in receipts. Three boat loads of mill scrap have been scheduled to come down the Lakes, one near the end of this month,

and one each in October and November. All leading consumers report canal shipments over for the season.

ST. LOUIS—Rumors that OPA would act this week on scrap prices caused a continuation of the policy to hold on to material for higher ceilings and so virtually nothing was moved the last week to mills from dealers. Mills' consumption exceeds receipts but they have, it is estimated, a supply of from 30 to 40 days. In Kansas City, however, Sheffield Steel Corp. is down because of lack of scrap. Granite City Steel Co. is now operating four old furnaces and one of the DPC plant furnaces.

BOSTON—An occasional car of Nos. 1 and 2 steel, borings, turnings, skeleton and low phos plate moved in the past week. Some maintain blast furnace turnings, subject to crushing, come under the category of unprepared scrap, but will not admit shipments as such.

NEW YORK—Dealers and brokers here report shipments down to a new low because of the truck strike. Approximately 30,000 drivers are on strike in New York and northern New Jersey, preventing dealers' trucks from making pickups at shipyards, railroads and large industrial plants. There are indications here that OPA is recalling men from private industry to add to its inspection force to launch its drive on overgrading and similar practices.

CINCINNATI—Dealers in this area are hanging on by the skin of their teeth, and trying to parcel out shipments to regular customers. Foundries and steel producers are desperate for scrap, and trying to keep production going, with no evidence of a letup in the offing. There are still reports that tonnage was being held back for higher prices, although some dealers indicate that they do not think this is possible, because of the lack of production scrap.

CLEVELAND—All grades of scrap were in extremely tight supply during the past week as consumers, brokers and dealers awaited the OPA announcement. Quite a few cars are being held on tracks, reducing the dwindling shipments still further, with many consumers in the Warren and Youngstown area operating on a day-to-day basis.

TORONTO—Dealers report continued slowing in receipts and only small quantities are appearing in their yards. Iron scrap is in heavy demand, while supply is at a minimum and dealers are providing only a fraction of actual requirements. Farm communities are expected to make better offerings over the next couple of months. Industrial plants operating on reduced schedules due to shortage of steel, have little material to offer. Canadian scrap materials continue under price control with no indication that ceilings will be lifted in the early future.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bldd. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	16.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Roller steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovels, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Angles & splice bars	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Standard stl. car axles	25.75*
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast.	20.00*
Rails 3 ft. and under	22.25*
No. 1 agricul. cast.	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	\$10.50 to 11.00
Shovelling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Scrap rails	21.00*

BOSTON

Dealers' buying prices per gross ton,
f.o.b. cars

No. 1 hvy. melting	\$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovellings	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
CI'n cast, chem. bor.	\$13.06 to 14.15
Machinery cast	20.00*
Breakable cast.	16.50*
Stove plate	19.00*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	\$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used they indicate the OPA ceiling price to which must be added brokerage fee and adjusted freight.

Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.32*
No. 1 cupola cast.	20.00*
Charging box cast.	19.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Automotive cast.	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shovelling turn.	15.75*
Cast iron borings	14.75*
Mixed bor. & turn.	13.75*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	13.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

• • • At press time it was impossible to secure details on the increases in cast grades. These prices are therefore subject to change.

ST. LOUIS

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

Heavy melting	\$17.50*
Bundled sheets	17.50*
Mach. shop turn.	12.50*
Locomotive tires, uncut	21.00*
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	24.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ry cast	20.00*
Breakable cast.	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	12.00*
Shovelling turnings	14.00*
Cast iron borings	13.00*
Bar crops and plate	\$18.50 to 19.50*
Structural and plate	18.50 to 19.50*
No. 1 cast	20.00*
Stove plate	19.00*
Steel axles	18.50*
Scrap rails	18.50*
Rerolling rails	20.50*
Angles & splice bars	20.50 to 21.00*
Rails 3 ft. & under	21.00*
Cast iron carwheels	19.00*

YOUNGSTOWN

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel, turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shovelling turn.	12.33*
No. 1 cupola cast.	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Stove plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
CI'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shovelling turn.	16.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00*
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

RR. hvy. melting	\$18.00*
No. 1 hvy. melting	17.00*
No. 2 hvy. melting	17.00*
No. 2 bales	\$15.00 to 15.75
No. 3 bales	8.50 to 9.25
Mach. shop turn.	6.50 to 7.25
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast.	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

RR. hvy. melting	\$14.50*
No. 1 & No. 2 hvy. melting	14.50*
Elec. furn. 1 ft. und.	\$14.00 to 15.00
No. 1 cupola cast.	20.00*

HAMILTON, ONT.

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

Heavy melting	\$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	13.50*
Rails, rerolling	21.50*
Bushellings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

Advances over past week in Heavy Type; declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel:	Sept. 10, 1946	Sept. 3, 1946	Aug. 6, 1946	Sept. 11, 1945
(cents per pound)	1946	1946	1946	1945
Hot-rolled sheets	2.425	2.425	2.425	2.20
Cold-rolled sheets	3.275	3.275	3.275	3.05
Galvanized sheets (24 ga.)	4.05	4.05	4.05	3.70
Hot-rolled strip				
6-in. and under	2.45	2.45	2.45	2.10
Over 6 in.	2.35	2.35	2.35	2.10
Cold-rolled strip	3.05	3.05	3.05	2.80
Plates	2.50	2.50	2.50	2.25
Plates, wrought iron	4.112	4.112	4.112	3.80
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00

Tin and Terneplate:	Sept. 10, 1946	Sept. 3, 1946	Aug. 6, 1946	Sept. 11, 1945
(dollars per base box)				
Tinplate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tinplate, electro (0.50 lb)	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes:	Sept. 10, 1946	Sept. 3, 1946	Aug. 6, 1946	Sept. 11, 1945
(cents per pound)				
Merchant bars	2.50	2.50	2.50	2.25
Cold-finished bars	3.10	3.10	3.10	2.75
Alloy bars	2.92	2.92	2.92	2.70
Structural shapes	2.35	2.35	2.35	2.10
Stainless bars (No. 302)	25.97	25.97	25.97	24.00
Wrought iron bars	4.76	4.76	4.76	4.40

Wire and Wire Products:	Sept. 10, 1946	Sept. 3, 1946	Aug. 6, 1946	Sept. 11, 1945
(cents per pound)				
Bright wire	3.05	3.05	3.05	2.75
Wire nails	3.75	3.75	3.75	2.90

Rails:	Sept. 10, 1946	Sept. 3, 1946	Aug. 6, 1946	Sept. 11, 1945
(dollars per net ton)				
Heavy rails	\$43.39	\$43.39	\$43.39	\$43.00*
Light rails	49.18	49.18	49.18	45.00*
*per gross ton				

Semifinished Steel:	Sept. 10, 1946	Sept. 3, 1946	Aug. 6, 1946	Sept. 11, 1945
(dollars per gross ton)				
Rerolling billets	\$39.00	\$39.00	\$39.00	\$36.00
Sheet bars	38.00	38.00	38.00	36.00
Slabs, rerolling	39.00	39.00	39.00	36.00
Forging billets	47.00	47.00	47.00	42.00
Alloy blooms, billets, slabs	58.43	58.43	58.43	54.00

Wire Rods and Skelp:	Sept. 10, 1946	Sept. 3, 1946	Aug. 6, 1946	Sept. 11, 1945
(cents per pound)				
Wire rods	2.30	2.30	2.30	2.15
Skelp	2.05	2.05	2.05	1.90

Pig Iron*:	Sept. 10, 1946	Sept. 3, 1946	Aug. 6, 1946	Sept. 11, 1945
(per gross ton)				
No. 2 foundry, Phila.	\$30.43	\$30.43	\$30.43	\$26.84
No. 2, Valley furnace	28.50	28.50	28.50	25.00
No. 2, Southern, Cin'ti.	27.80	27.80	27.80	25.44
No. 2, Birmingham	24.88	24.88	24.88	21.38
No. 2 foundry, Chicago†	28.50	28.50	28.50	25.00
Basic, del'd eastern Pa.	29.93	29.93	29.93	26.34
Basic, Valley furnace	28.00	28.00	28.00	24.50
Malleable, Chicago†	28.50	28.50	28.50	25.00
Malleable, Valley	28.50	28.50	28.50	25.00
L. S. charcoal, Chicago	42.34	42.34	42.34	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.

‡ For carlots at seaboard.

* Prices retroactive to May 29; the price increase should be reflected in THE IRON AGE Comparison of Prices table since June 4.

Scrap:	Sept. 10, 1946	Sept. 3, 1946	Aug. 6, 1946	Sept. 11, 1945
(per gross ton)				
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00*	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00*	20.00	20.00	20.00
No. 1 cast, Chicago	20.00*	20.00	20.00	20.00

*As of Sept. 9, 1946.

Coke, Connellsville:	Sept. 10, 1946	Sept. 3, 1946	Aug. 6, 1946	Sept. 11, 1945
(per net ton at oven)				
Furnace coke, prompt	\$8.75	\$8.75	\$7.50	\$7.50
Foundry coke, prompt	8.50	8.50	8.50	9.00

Nonferrous Metals:	Sept. 10, 1946	Sept. 3, 1946	Aug. 6, 1946	Sept. 11, 1945
(cents per pound to large buyers)				
Copper, electro., Conn.	14.375	14.375	14.375	12.00
Copper, Lake, Conn.	14.375	14.375	14.375	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	8.10	8.10	8.10	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

Composite Prices . .

FINISHED STEEL

Sept. 10, 1946	2.73011¢ per lb.
One week ago	2.73011¢ per lb.
One month ago	2.73011¢ per lb.
One year ago	2.44076¢ per lb.

	HIGH	LOW
1946	2.73011¢ July	4 2.54490¢ Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5
1943	2.29176¢	2.29176¢
1942	2.28249¢	2.28249¢
1941	2.43078¢	2.43078¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.26689¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933	1.95578¢ Oct. 3	1.75836¢ May 2
1932	1.89196¢ July 5	1.83901¢ Mar. 1
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

PIG IRON

.....\$28.13 per gross ton.....
.....\$28.13 per gross ton.....
.....\$28.13 per gross ton.....
.....\$24.61 per gross ton.....

	HIGH	LOW
28.13 May 29	25.37 Jan. 1	
25.37 Oct. 23	23.61 Jan. 2	
23.61	23.61	
23.61	23.61	
23.61 Mar. 20	23.45 Jan. 2	
23.45 Dec. 23	22.61 Jan. 2	
22.61 Sept. 19	20.61 Sept. 12	
23.25 June 21	19.61 July 6	
23.25 Mar. 9	20.25 Feb. 16	
19.74 Nov. 24	18.73 Aug. 11	
18.84 Nov. 5	17.83 May 14	
17.90 May 1	16.90 Jan. 27	
16.90 Dec. 5	13.56 Jan. 3	
14.81 Jan. 5	13.56 Dec. 6	
15.90 Jan. 6	14.79 Dec. 15	
18.21 Jan. 7	15.90 Dec. 16	
18.71 May 14	18.21 Dec. 17	

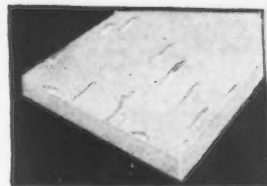
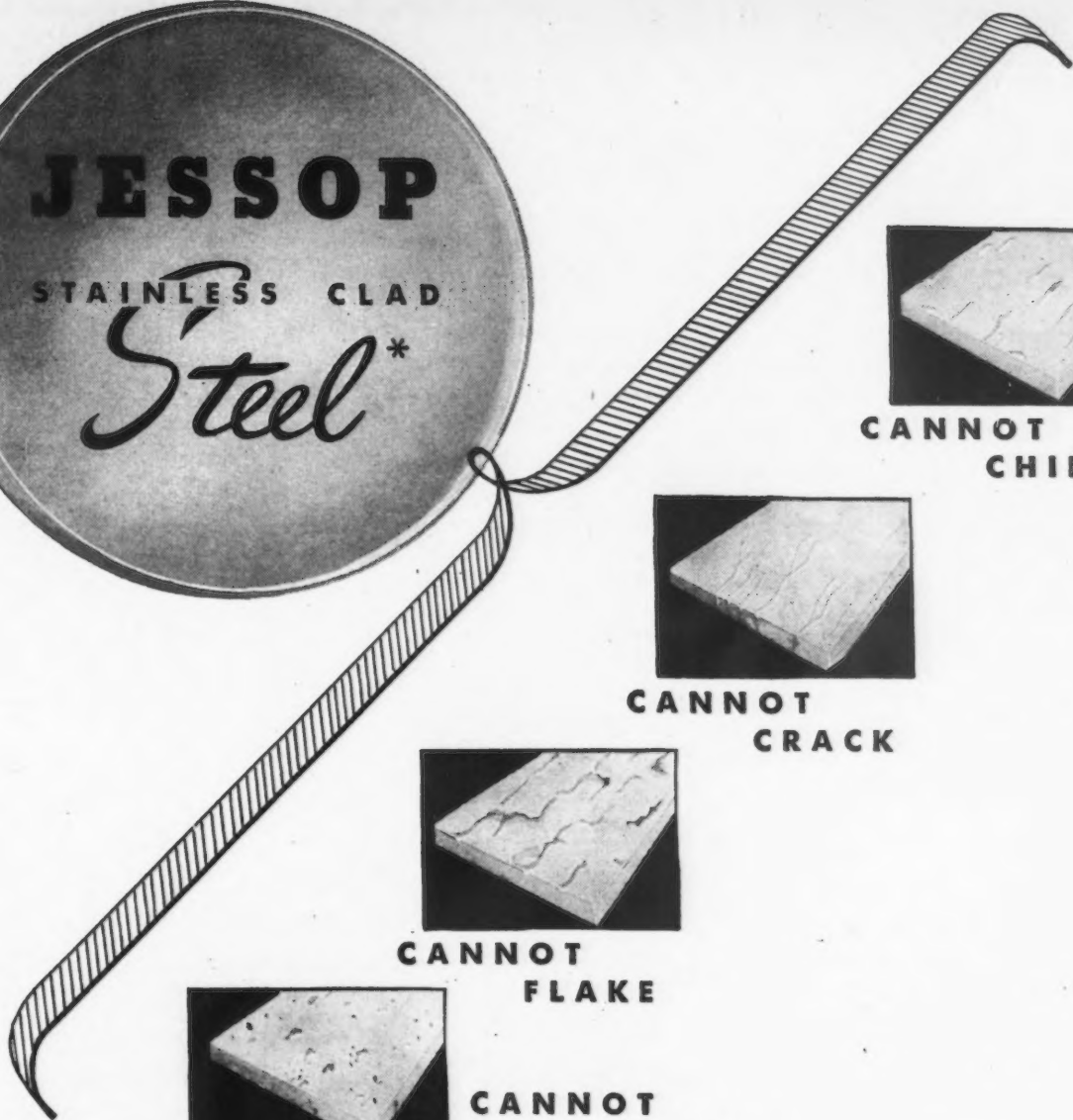
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo Valley and Birmingham.

SCRAP STEEL

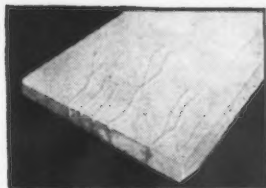
.....\$19.17 per gross ton.....
.....\$19.17 per gross ton.....
.....\$19.17 per gross ton.....
.....\$19.17 per gross ton.....

	HIGH	LOW
\$19.17	\$19.17	
\$19.17 Jan. 2	\$18.92 May 22	
19.17 Jan. 11	15.76 Oct. 24	
\$19.17	\$19.17	
19.17	19.17	
\$22.00 Jan. 7	\$19.17 Apr. 10	
21.83 Dec. 30	16.04 Apr. 9	
22.50 Oct. 3	14.08 May 16	
15.00 Nov. 22	11.00 June 7	
21.92 Mar. 30	12.67 June 9	
17.75 Dec. 21	12.67 June 8	
13.42 Dec. 10	10.33 Apr. 29	
13.00 Mar. 13	9.50 Sept. 25	
12.25 Aug. 8	6.75 Jan. 3	
8.50 Jan. 12	6.43 July 5	
11.33 Jan. 6	8.50 Dec. 29	
15.00 Feb. 18	11.25 Dec. 9	
17.58 Jan. 29	14.08 Dec. 3	

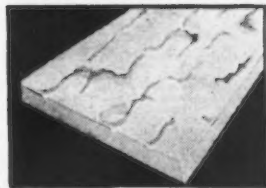
Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.



**CANNOT
CHIP**



**CANNOT
CRACK**



**CANNOT
FLAKE**



**CANNOT
PIT**

AND *Successfully* RESISTS

ABRASION • HEAT
MOISTURE • CORROSION
And Other Mechanical
And Chemical Abuse

Jessop Stainless-Clad Steel affords COMPLETE and PERMANENT protection against physical and chemical action of many descriptions. The stainless surface is not a "coating" or "lining" but is an integral part of the composite metal. For this reason it can never be separated from the mild steel base. Jessop Stainless-Clad Steel gives maximum protection plus durability obtainable only from a metal surface. Degree of stainless

cladding can be varied from 5 to 50%, depending upon the application and the gauge of material. If you use equipment subject to corrosion, Jessop Stainless-Clad Steel will protect your investment for years. If you make such equipment, it will add materially to the sales value of your product. In any case, investigate the multiple advantages of Jessop Stainless-Clad Steel without delay.

*U. S. Pat. Nos. 1,997,538; 2,044,742; 2,147,407; and 2,225,868.
Can. Pat. No. 383,153.



JESSOP STEEL CO.

WASHINGTON, PA.

Iron and Steel Prices...

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15¢ per lb higher.

Basing Points	DELIVERED TO												Detroit	New York	Philadelphia
	Pitts-burgh	Chicago	Gary	Cleve-land	Birm-ingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars			
INGOTS															
Carbon, rerolling															
Carbon, forging	\$38	\$38	\$38	\$38	\$38	\$38	\$38								
Alloy.....	\$48.69	\$48.69				\$48.69									
BILLETS, BLOOMS, SLABS															
Carbon, rerolling	\$39	\$39	\$39	\$39	\$39	\$39	\$39	\$39				\$51 ¹⁴	\$41		
Carbon, forging billets.....	\$47	\$47	\$47	\$47	\$47	\$47	\$47	\$47				\$59 ¹⁴	\$49		
Alloy	\$58.43	\$58.43				\$58.43							\$60.43		
SHEET BARS	\$38	\$38		\$38		\$38	\$38	\$38							
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢							
WIRE RODS ¹⁵															
No. 5 to 9/32 in.	2 30¢	2 30¢		2 30¢	2 30¢							2 55¢	2 80¢		
SHEETS															
Hot-rolled	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.525¢	2.425¢		2.975¢	2.525¢	2.685¢	2.615¢
Cold-rolled ¹	3.275¢	3.275¢	3.275¢	3.275¢		3.275¢	3.275¢		3.375¢	3.275¢		3.925¢	3.375¢	3.615¢	3.635¢
Galvanized (24 gage)	4.05¢	4.05¢	4.05¢		4.05¢	4.05¢	4.05¢	4.05¢	4.15¢	4.05¢		4.60¢		4.31¢	4.24¢
Enameling (20 gage)	3.80¢	3.80¢	3.80¢	3.80¢			3.80¢		3.90¢	3.80¢		4.45¢	3.90¢	4.20¢	4.16¢
Enameling (10 Gage)	3.20¢	3.20¢	3.20¢	3.20¢			3.20¢		3.30¢	3.20¢		3.85¢	3.30¢	3.60¢	3.56¢
Long ternes ²	4.05¢	4.05¢	4.05¢									4.80¢		4.45¢	4.41¢
STRIP															
Hot-rolled ³ 6 in. and under over 6 in.	2.45¢ 2.35¢	2.45¢ 2.35¢	2.45¢ 2.35¢	2.45¢ 2.35¢	2.45¢ 2.35¢		2.45¢ 2.35¢			2.45¢ 2.35¢		3.10¢ 3.00¢	2.55¢ 2.45¢	2.85¢ 2.75¢	2.81¢ 2.71¢
Cold-rolled ⁴	3.05¢	3.15¢		3.05¢			3.05¢		(Worcester=3.25¢)				3.15¢	3.45¢	3.41¢
Cooperage stock	2.55¢	2.55¢			2.55¢		2.55¢							2.95¢	
TINPLATE															
Standard cokes, base box	\$5.00	\$5.00	\$5.00		\$5.10			\$5.10	\$5.10					\$5.375	\$5.301
Electro, box	0.25 lb \$4.35 0.50 lb \$4.50 0.75 lb \$4.65	0.25 lb \$4.35 0.50 lb \$4.50 0.75 lb \$4.65	0.25 lb \$4.35 0.50 lb \$4.50 0.75 lb \$4.65					\$4.35 \$4.50 \$4.75	\$4.60 \$4.75						
BLACKPLATE															
29 gage ⁵	3.30¢	3.30¢	3.30¢					3.40¢	3.40¢					3.67¢	3.59¢
TERNES, MFG.															
Special coated, base box	\$4.30	\$4.30	\$4.30					\$4.40	\$4.40						
BARS															
Carbon steel	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		(Duluth=2.60¢) (Provo, Utah=3.20¢)		2.85¢	3.15¢	2.60¢	2.84¢	2.86¢
Rail steel ⁶	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢					2.85¢	3.15¢			
Reinforcing (billet) ⁷	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.70¢	2.75¢	2.45¢	2.61¢	2.69¢		
Reinforcing (rail) ⁷	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢		2.70¢	2.75¢	2.45¢				
Cold-finished ⁸	3.10¢	3.10¢	3.10¢	3.10¢		3.10¢			(Detroit=3.15¢) (Toledo=3.25¢)				3.44¢	3.46¢	
Alloy, hot-rolled	2.92¢	2.92¢				2.92¢	2.92¢		(Bethlehem, Massillon, Canton=2.92¢)			3.02¢			
Alloy, cold-drawn	3.62¢	3.62¢	3.62¢	3.62¢		3.62¢						3.73¢			
PLATE															
Carbon steel ¹³	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢		(Coatesville and Claymont=2.50¢, Provo, Utah=3.20¢) 2.50¢		2.85¢	3.05¢	2.72¢	2.71¢	2.558¢
Floor plates	3.75¢	3.75¢									4.10¢	4.40¢		4.15¢	4.15¢
Alloy	3.79¢	3.79¢									4.27¢	4.49¢		4.01¢	3.895¢
SHAPES															
Structural	2.35¢	2.35¢	2.35¢		2.35¢	2.35¢			(Bethlehem=2.35¢)		2.60¢	3.00¢		2.54¢	2.48¢
SPRING STEEL, C-R ¹⁶															
0.26 to 0.50 carbon	3.05¢			3.05¢					(Worcester=3.25¢)						
0.51 to 0.75 carbon	4.65¢			4.65¢					(Worcester=4.85¢)						
0.76 to 1.00 carbon	6.65¢			6.65¢					(Worcester=6.85¢)						
1.01 to 1.25 carbon	9.03¢			9.03¢ ⁷					(Worcester=9.23¢)						
WIRE ⁹															
Bright ¹²	3.05¢	3.05¢		3.05¢	3.05¢				(Worcester=3.15¢) (Duluth=3.10¢)		3.55¢		3.44¢	3.41¢	
Galvanized									Add proper size extra and galvanizing extra to Bright Wire Base						
Spring (high carbon)	4.00¢	4.00¢		4.00¢					(Worcester=4.10¢) (Trenton=4.25¢)		4.50¢		4.39¢	4.339¢	
PILING															
Steel sheet	2.65¢	2.65¢				2.65¢					3.20¢		2.99¢	3.01¢	

PRICES

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, Pgh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, Pgh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, Pgh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets Pgh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, Pgh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville.	22.99	24.67	17.01	17.47	20.69	25.29
Bars, h-r, Pgh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville.	27.05	25.97	20.02	20.56	24.34	29.75
Bars, c-r, Pgh, Chi, Cleva, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet.	27.05	25.97	20.02	20.56	24.34	29.75
Plates, Pgh, Middletown, Canton.	31.38	29.21	23.28	23.80	28.67	33.00
Shapes, structural, Pgh, Chi.	27.05	25.97	20.02	20.56	24.34	29.75
Sheets, Pgh, Chi, Middletown, Canton, Balt.	38.95	36.78	28.67	31.38	35.16	38.49
Strip, h-r, Pgh, Chi, Reading, Canton, Youngstown.	25.43	23.25	18.39	18.93	25.97	37.87
Strip, c-r, Pgh, Cleva, Newark, N. J., Reading, Canton, Youngstown.	32.46	30.30	23.80	24.34	34.62	56.28
Wire, c-d, Cleva, Dunkirk, Syracuse, Balt, Reading, Canton, Pgh, Newark, N. J., Phila.	27.05	25.97	20.02	20.56	24.34	29.75
Wire, flat, c-r, Cleva, Balt, Reading, Dunkirk, Canton.	32.46	30.30	23.80	24.34	34.62	56.28
Rod, h-r, Newark, N. J., Syracuse.	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, Pgh, Chi, Canton, (4 in. to 8 in.).	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., net ton	\$43.39
Angle splice bars, 100 lb	2.85
(F.o.b. basing points)	per net ton
Light rails (from billets)	\$49.18
Light rails (from rail steel)	49.18
	base per lb
Cut spikes	3.65¢
Screw spikes	5.55¢
Tie plate, steel	2.55¢
Tie plates, Pacific Coast	2.70¢
Track bolts	6.50¢
Track bolts, heat treated, to rail-roads	6.75¢
Track bolts, jobbers discount	63-5
Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.	

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	\$8.50	\$17.00
15-lb coating I.C.	9.50	19.00
20-lb coating I.C.	10.00	20.00

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	21.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.72	.....
Inconel-clad		
10 pct, f.o.b. Coatesville..	26.00	.....
Monel-clad		
10 pct, f.o.b. Coatesville..	24.96	.....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	.....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points	Coast Basing Points†
Standard wire nails	base per keg \$3.75	\$4.25
Coated nails	3.75	4.25
Cut nails, carloads	4.85	.....
Annealed fence wire	base per 100 lb \$3.50	\$4.00
Annealed galv. fence wire	3.85	4.35
Woven wire fence*	base column 72	90
Fence posts, carloads..	74	91
Single loop bale ties††	72	97
Galvanized barbed wire**	79	89
Twisted barbless wire..	79	89

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

††Add 50¢ a ton.

HIGH TENSILE, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	Hi Steel	Mayari R	Otis-coley	Yoloy	Y-50
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill
Plates.....	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	.....
Sheets									
Hot-rolled....	3.575	3.575	3.575	3.575	3.575	3.575	3.575	3.575	.....
Cold-rolled....	4.525	4.525	4.525	.....	4.525	4.525	4.525	4.525	5.225*
Galvanized....	.....	.....	.....	.....	.....	5.50	.....	.....	.....
Strip									
Hot-rolled									
Over 6-in....	3.60	3.60	3.60	.....	3.60	3.60	3.60	3.60	.....
6-in & under	3.70	3.70	3.70	.....	3.70	3.70	3.70	3.70	.....
Cold-rolled....	4.30	.....	4.30	.....	4.40	.....	4.30	4.30	5.00*
Commodity....	.....	.....	.....	.....	.....	.....	4.45	.....	.....
Shapes.....	.....	3.45	.....	.....	3.45	3.45	3.45	3.45	.....
Beams.....	.....	3.45	.....	.....	.....	3.45	.....	.....	.....
Bars									
Hot-rolled....	3.70	3.70	3.70	.....	.....	3.70	3.70	3.732†	.....
Cold-rolled....	.....	.....	.....	.....	.....	.....	.....	4.382†	.....
Bar shapes....	.....	3.85	.....	.....	3.85	3.85	3.85	3.85	.....
Billets, blooms, slabs (per gross ton)	.....	.....	.....	.....	.....	.....	.....	.....	.....
Structural....	.....	.....	.....	.....	.....	.....	.....	\$73.95†	.....
Forging....	.....	.....	.....	.....	.....	.....	.....	\$82.23†	.....

* 21 gage and lighter. † Alloy extras apply. ‡ Add 0.379¢ for forging grade, heat treated.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe) base price—\$200.00 per net ton

Steel (buttweld)

	Black	Galv.
1/2-in.	60 1/2	48
3/4-in.	63 1/2	52
1-in. to 3-in.	65 1/2	54 1/2

Wrought Iron (buttweld)

	17%	+4%
1/2-in.	24 1/2	2 1/2
3/4-in.	28 1/2	9 1/2
1-in. and 1 1/4-in.	33	11 1/2
2-in.	32 1/2	11 1/2

Steel (lapweld)

	58	46 1/2
2-in.	61	49 1/2
2 1/2-in. and 3-in.	63	51 1/2

Wrought Iron (lapweld)

	24%	4 7/8
2-in.	25 1/2	7 1/2
2 1/2-in. to 3 1/2-in.	28 1/2	11 1/2
4-in.	27	10 1/2

Steel (butt, extra strong, plain ends)

	58 1/2	47 1/2
1/2-in.	62 1/2	51 1/2
3/4-in.	64	54

Wrought Iron (same as above)

	18%	+1%
1/2-in.	25 1/2	4 1/2
3/4-in.	33	13

Steel (lap, extra strong, plain ends)

	56	45 1/2
2-in.	60	49 1/2
2 1/2-in. and 3-in.	63 1/2	53

Wrought Iron (same as above)

	28%	8 5/8
2-in.	34	16 1/2
2 1/2-in. to 4-in.	32 1/2	14 1/2

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or \$2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless Cold-Drawn	Hot-Rolled	Lapweld Hot-Rolled
2 in. O.D. 13 B.W.G.	16.52	13.90	13.20
2 1/2 in. O.D. 12 B.W.G.	22.21	18.70	17.67
3 in. O.D. 12 B.W.G.	24.71	20.79	19.56
3 1/2 in. O.D. 11 B.W.G.	31.18	26.25	24.68
4 in. O.D. 10 B.W.G.	38.68	32.56	30.55

(Extras for less carload quantities)
40,000 lb or ft and over Base
30,000 lb or ft to 39,999 lb or ft 5 pct
20,000 lb or ft to 29,999 lb or ft 10 pct
10,000 lb or ft to 19,999 lb or ft 20 pct
5,000 lb or ft to 9,999 lb or ft 30 pct
2,000 lb or ft to 4,999 lb or ft 45 pct
Under 2,000 lb or ft 65 pct

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in., del'd Chicago	\$70.33
6-in. to 24-in., del'd New York	69.60
6-in. to 24-in., Birmingham	61.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle for all rail shipment; rail and water shipment less 84.40	
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

BOLTS, NUTS, RIVETS, SET SCREWS

An increase of 12 pct applies to listings except Large Rivets

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
1/2 in. & smaller x 6 in. & shorter	65 1/2
9/16 & 5/8 in. x 6 in. & shorter	63 1/2
3/4 to 1 in. x 6 in. & shorter	61
1 1/4 in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag. all sizes	62
Flow bolts	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

1/2 in. and smaller	62
9/16 to 1 in. inclusive	59
1 1/4 to 1 1/2 in. inclusive	57
1 1/2 in. and larger	56
On above bolts and nuts, excepting plov bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.	

Semifin. Hexagon Nuts U.S.S. S.A.E.

Base discount less keg lots

7/16 in. and smaller	64
1/2 in. and smaller	62
1/2 in. through 1 in.	60
9/16 in. through 1 in.	59
1 1/4 in. through 1 1/2 in.	57
1 1/2 in. and larger	56

In full keg lots, 10 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Consumer

Packages, nuts loose	71 and 10
In packages	71
In bulk	80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(1/2 in. and larger)

Base per 100 Lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$4.75
F.o.b. Lebanon, Pa.	4.90

Small Rivets

(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws

(In packages)

Consumer

Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

	Base price per short ton
Effective CaF ₂ Content: 70% or more	\$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	\$5.45
Old range, non-bessemer	5.30
Mesaba, bessemer	5.20
Mesaba, non-bessemer	5.05
High phosphorus	5.05

Prices are for ore shipped on and after June 24, 1946, and for ore covered by adjustable pricing agreements authorized by Order No. 8, RMPR 113.

These prices do not reflect the recent ICC increase in freight rates.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	19 1/4¢ to 21 1/4¢
Copper, electrolytic, 100 and 375 mesh	23 1/2¢ to 27 1/2¢
Copper, reduced, 150 and 200 mesh	22 1/2¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe	11¢ to 16¢
Swedish sponge iron, 100 mesh, c.l.f.	
N. Y., carlots, Ocean bags	7.4¢ to 8¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	4¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	63¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	25¢ to 31¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to \$1.75
Aluminum, 100, 200 mesh, carlots	25¢
Antimony, 100 mesh	30¢
Cadmium, 100 mesh	\$1.75
Chromium, 100 mesh and finer	\$1.25
Lead, 100, 200 & 300 mesh, 13 1/4¢ to 16 1/4¢	
Manganese, minus 325 mesh and coarser	44¢ to 61¢
Nickel, 150 mesh	51 1/2¢
Silicon, minus 325 mesh and coarser	26¢ to 55¢
Solder powder, 100 mesh, 8 1/4¢ plus metal	
Tin, 100 mesh	58 1/2¢
Tungsten metal powder, 98%-99%, any quantity, per lb.	\$2.60
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.	\$2.65
Under 100 lb.	\$2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	\$8.75
Connellsville, Pa., hand drawn.	9.35
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.50

Foundry, Byproduct

Chicago, del'd	15.10
Chicago, f.o.b.	14.35
New England, del'd	16.04
Kearny, N. J. f.o.b.	14.40
Philadelphia, del'd	14.63
Buffalo, del'd	14.75
Portsmouth, Ohio, f.o.b.	12.35
Painesville, Ohio, f.o.b.	13.50
Erie, del'd	14.50
Cleveland, del'd	14.55
Cincinnati, del'd	14.60
St. Louis, del'd	15.10†
Birmingham, del'd	12.25

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of \$15.60 in the St. Louis Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	\$76.05
First quality, Pa., Md., Ky., Mo., Ill., Ohio	60.40
First quality, New Jersey	65.90
Sec. quality, Pa., Md., Ky., Mo., Ill.	54.80
Sec. quality, New Jersey	67.70
Sec. quality, Ohio	62.95
Ground fire clay, net ton, bulk	8.95

Silica Brick

Pennsylvania and Birmingham	\$60.40
Chicago District	69.30
Silica cement, net ton (Eastern)	10.60

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	\$54.00

Magnesite Brick

Standard, Balt. and Chester	\$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks	\$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	22.00
in sacks	26.00
Clinker (dead burned) dolomite, per ton East, \$9.30; Midwest, add 10¢; Mo. Valley, add 20¢.	

PRICES

WAREHOUSE PRICES

Delivered metropolitan areas, per 100 lb.

Cities	SHEETS			STRIP			Plates ½ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot- Rolled (10 gage)	Cold- Rolled	Galvanized (24 gage)	Hot-Rolled		Cold- Rolled			Hot- Rolled	Cold- Finished	Hot- Rolled, A-8617-20	Hot- Rolled, A-8742-50 Ann.	Cold- Drawn, A-8617-20	Cold- Drawn, A-8742-50 Ann.
				6 in. and Under	Over 6 in.									
**Philadelphia.....	\$3.743	\$5.097	\$5.218a	\$4.272	\$4.172	\$5.022	\$3.855	\$3.916	\$4.072	\$4.522	\$6.016	\$7.116	\$7.372	\$8.422
New York.....	3.815	4.838 ¹	5.46	4.324	4.224	5.024	4.018	4.008	4.103	4.553	6.058	7.158	7.403	8.453
Boston.....	3.999	4.969 ³	5.674	4.456	4.356	4.965	4.162	4.162	4.294	4.594	6.212	7.312	7.444	8.494
Baltimore.....	3.619	5.077	5.344	4.252	4.152	.....	3.844	4.009	4.052	4.502	6.109	7.209	7.352	8.402
Norfolk.....	3.996	.....	5.821	4.515	4.415	.....	4.221	4.252	4.315	4.615	.....	.....	.....	.....
Chicago.....	3.475	4.425	5.581	3.95	3.85	4.96 ⁶	3.80	3.80	3.75	4.20	5.80	6.90	.....	8.00
Milwaukee.....	3.612	4.562 ¹	5.537	4.087	4.077	5.037 ⁶	3.937	3.937	3.887	4.337	6.037	7.037	7.187	8.237
Cleveland.....	3.575	4.625	5.327	3.95	3.85	4.70 ⁶	3.65	3.838	3.60	4.20	6.006	7.106	6.95	8.00
Buffalo.....	3.575	4.625	5.20	4.169	4.109	4.959 ⁶	3.92	3.65	3.60	4.20	5.80	6.90	6.95	8.00
Detroit.....	3.675	4.725	5.45	4.05	3.95	.....	3.859	3.911	3.70	4.25	6.13	7.23	7.55	8.65
Cincinnati.....	3.65	4.70 ¹	5.275	4.025	3.925	4.961	3.911	3.941	3.861	4.461	6.15	7.25	7.311	8.35
St. Louis.....	3.622	4.572 ¹	5.581	4.097	3.997	5.181 ⁶	3.947	3.947	3.897	4.481	6.181	.....	7.331	.....
Pittsburgh.....	3.575	4.625	5.20	3.95	3.85	4.70	3.65	3.65	3.60	4.20	5.80	6.90	6.95	7.98
St. Paul.....	3.797	4.747	5.635	4.272	4.172	5.352	4.122	4.122	4.072	4.811	6.202	6.302	7.352	7.402
Omaha.....	4.045	5.72	6.00	4.52	4.42	.....	4.37	4.37	4.32	4.945	.....	.....	.....	.....
Indianapolis.....	3.745	4.795	5.37	4.12	4.02	4.99	3.88	3.88	3.83	4.43	6.13	.....	7.28	.....
Birmingham.....	3.675	.....	5.20	4.05	3.95	.....	3.80	3.80	3.75	4.903	.....	.....	.....	.....
Memphis.....	4.19	4.885	5.715	4.585	4.465	.....	4.315	4.315	4.265	4.78	.....	.....	.....	.....
New Orleans.....	4.283 ⁶	5.304	5.808	4.658	4.558	.....	4.408	4.455 ⁶	4.358 ⁶	5.079	.....	.....	.....	.....
Houston.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Los Angeles.....	4.85	6.60 ¹	6.55	5.30	5.20	.....	4.80	4.70	4.65	6.03	.....	.....	.....	.....
San Francisco.....	4.12	6.87	6.35	4.60	4.50	4.15	4.15	4.15	4.30	5.78	.....	.....	.....	.....
Seattle.....	4.87 ⁵	7.27 ²	6.40	4.60	4.50	.....	5.00 ⁵	4.70 ⁵	4.60 ⁵	6.23	.....	.....	.....	.....
Portland.....	4.87 ⁴	6.82 ²	6.20	5.10	5.00	.....	5.00 ⁴	4.70 ⁴	4.70 ⁴	5.98	8.15	.....	9.20	.....
Salt Lake City.....	4.75	.....	6.62 ⁷	5.88	5.78	.....	5.23 ⁷	5.23 ⁷	5.13	6.35	.....	.....	.....	.....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars, 1500 lb base.

NE ALLOY BARS: 1000 to 39,999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 450 to 3749 lb; (4) 300 to 4999 lb; (5) 300 to 19,000 lb; (6) 2000 lb and over; (7) 3500 lb and over.

(*) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

* Add 0.271¢ for sizes not rolled in Birmingham.

** City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Per gross ton, retroactive to May 29.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	29.00	29.50	30.00	30.50	34.00	Boston	Everett	\$0.50 Arb.	29.50	30.00	30.50	31.00	38.47
Birdsboro	29.00	29.50	30.00	30.50	34.00	Boston	Birdsboro-Steelton	4.47	31.78	32.28	32.78	33.28	37.28
Birmingham	23.50*	24.88*	...	29.50	...	Brooklyn	Bethlehem	2.78	31.78	32.28	32.78	33.28	37.28
Buffalo	27.50	28.50	29.00	29.50	34.00	Brooklyn	Birdsboro	3.26	31.78	32.28	32.78	33.28	37.28
Chicago	28.00	28.50	28.50	29.00	...	Canton	Clev. Ygtn, Sharpsvil.	1.54	29.54	30.04	30.54	31.04	37.55
Cleveland	28.00	28.50	28.50	29.00	...	Canton	Buffalo	3.55	29.54	30.04	30.54	31.04	37.55
Detroit	28.00	28.50	28.50	29.00	...	Cincinnati	Birmingham	4.30	27.80*	29.16*	...	...	...
Duluth	28.50	29.00	29.00	29.50	...	Cincinnati	Hamilton	1.24	...	...	29.74	...	...
Erie	28.00	28.50	29.00	29.50	...	Cincinnati	Buffalo	4.89	...	...	...	...	38.89
Everett	29.00	29.50	30.00	30.50	...	Jersey City	Bethlehem	1.70	30.70	31.20	31.70	32.20	38.16
Granite City	28.00	28.50	28.50	29.00	...	Jersey City	Birdsboro	2.16	...	...	...	...	...
Hamilton	28.00	28.50	28.50	29.00	...	Los Angeles	Provo	5.25	31.25	31.75	...	...	50.33
Neville Island	28.00	28.50	28.50	29.00	...	Los Angeles	Buffalo	18.33	...	...	...	...	...
Provo	26.00	26.50	...	...	...	Mansfield	Cleveland-Toledo	2.16	30.16	30.66	31.16	31.66	37.74
Sharpsville	28.00	28.50	28.50	29.00	...	Mansfield	Buffalo	3.74	...	...	...	...	...
Sparrows Point	29.00	29.50	...	...	...	Philadelphia	Swedeland	0.93	29.93	30.43	30.93	31.43	35.38
Steelton	29.00	...	...	...	34.00	Philadelphia	Birdsboro	1.38	...	...	...	...	...
Swedeland	29.00	29.50	30.00	30.50	...	San Francisco	Provo	5.25	31.25	31.75	...	...	50.33
Toledo	28.00	28.50	28.50	29.00	...	San Francisco	Buffalo	18.33	...	...	...	...	...
Youngstown	28.00	28.50	28.50	29.00	...	Seattle	Provo	5.25	31.25	31.75	...	...	50.33
						Seattle	Buffalo	18.33	...	...	...	...	...
						St. Louis	Granite City	0.50 Arb.	28.50	29.00	29.50	30.00	41.86
						St. Louis	Buffalo	7.86	...	...	...	...	...

* Republic Steel Corp. has been granted a \$2 increase on basic and foundry pig iron produced at Birmingham.

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, \$33.00 and \$34.00, respectively. Newberry Brand of Lake Superior charcoal iron \$39.00 per g.t., f.o.b. furnace. Delivered to Chicago, \$42.34.

High phosphorus iron sells at Lyles, Tenn., at \$28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each

0.50 pct manganese content in excess of 1.00 pct. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—\$34.00; f.o.b. Buffalo—\$35.25. Add \$1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add \$1.00 per ton for prices of comparable analysis.

FERROALLOY PRICES

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	\$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50
\$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.	
Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.	
	Eastern Central Western
Carload, bulk ..	6.05 6.30 6.60
Ton lots	6.65 7.55 8.55
Less ton lots ..	6.80 7.80 8.80

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn	19-21% Mn
	3% max. Si	3% max. Si
Carloads	\$35.00	\$36.00
Less ton	47.50	48.50
F.o.b. Pittsburgh, Chicago	40.00	

Manganese Metal

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.	
Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00	21.40	21.65
0.10% max. C	20.50	20.90	21.15
0.15% max. C	20.00	20.40	20.65
0.30% max. C	19.50	19.90	20.15
0.50% max. C	19.00	19.40	19.65
0.75% max. C			
7.00% max. Si	16.00	16.40	16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05
Ton lots	6.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet.	5.80
Ton lots	6.30
Less ton lots	6.55

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, \$51.25 f.o.b. Keokuk, Iowa; \$48.00 f.o.b. Jackson, Ohio; \$49.25 f.o.b. Niagara Falls. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots, packed.

	Eastern	Central	Western
96% Si, 2% Fe ..	13.10	13.55	16.50
97% Si, 1% Fe ..	13.45	13.90	16.80

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si.

	Eastern	Central	Western
Carload, bulk ..	3.60	3.75	3.90
Ton lots	4.05	4.55	4.60
Less ton lots ..	4.45	4.80	4.85

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
50% Si	7.05	7.50	7.65
75% Si	8.55	8.70	9.25
80-90% Si	9.50	9.65	10.15
90-95% Si	11.80	11.95	12.40

Ferrochrome

(65-72% Cr, 2% max. Si)
Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.50	21.90	22.50
0.50% C	21.00	21.40	22.00
1.00% C	20.50	20.90	21.50
2.00% C	19.50	19.90	20.50
66-71% Cr ..			
4-10% C ..	14.50	14.90	15.00
62-66% Cr ..			
5-7% C	15.05	15.45	15.55
Briquets—contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.			
	Eastern	Central	Western
Carload, bulk ..	9.20	9.50	9.90
Ton lots	9.80	10.30	11.80
Less ton lots ..	10.10	10.60	12.10

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66.71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.	
	Eastern Central Western
Carload	15.60 16.00 16.10
Ton lots	16.65 17.30 18.50
Less ton lots ..	17.30 17.95 19.15

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots ..	22.00	22.65	23.85

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C ..	83.50	85.00	86.25
0.50% max. C ..	79.50	81.00	82.25
9.00% min. C ..	79.50	81.00	82.25

Chromium—Copper

Contract price, cents per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu. 1.00% max. Fe, 0.50% max. Si.

Shot or ingot	45¢
---------------------	-----

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.	
	Eastern Central Western
Carloads	13.00 13.50 15.55
Ton lots	14.50 15.25 17.40
Less ton lots ..	15.50 16.25 18.40

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.	
	Eastern Central Western
Carloads	15.50 16.00 18.05
Ton lots	16.50 17.35 19.10
Less ton lots ..	17.00 17.85 19.60

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1¢ for central zone; 5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	\$1.35	\$1.75	\$4.25
Less ton lots ..	1.60	2.00	5.00

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.	
	Eastern Central Western
Ton lots	12.00 12.75 14.75
Less ton lots ..	12.50 13.25 15.25
Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.	
Ton lots	11.75 12.50 14.50
Less ton lots ..	12.25 13.00 15.00

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.	
	Eastern Central Western
Ton lots	12.00 12.85 14.60
Less ton lots ..	12.50 13.35 15.10

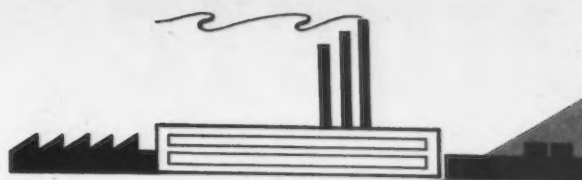
Other Ferroalloys

Ferrotungsten, standard, lump or ¼X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed ..	\$1.38
Ferrovandium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V ..	\$2.70
Openhearth	\$2.80
Crucible	\$2.90
High speed steel (Primos) ..	\$1.10
Vanadium pentoxide, 88-92% V ₂ O ₅ , technical grade, contract basis, per pound contained V ₂ O ₅ ..	\$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb. Ton lots ..	\$2.25
Less ton lots ..	\$2.30
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo ..	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo ..	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo ..	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo ..	80¢
Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti ..	\$1.23
Less ton lots ..	\$1.25
Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti ..	\$1.35
Less ton lots ..	\$1.40
High-carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads ..	\$142.50
Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalled with Rockdale, Tenn., per gross ton ..	\$58.50
Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton ..	\$75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots ..	14¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy.	
Carload, bulk ..	4.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload ..	5.75¢
Ton lots ..	7.25¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots ..	8.00¢
Ton lots ..	8.75¢
Less ton lots ..	9.25¢

Boron Agents	
Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.	
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.	
	Eastern Central Western
Less ton lots ..	\$1.30 \$1.3075 \$1.329

Manganese—Boron	
75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.	
Ton lots ..	\$1.89 \$1.903 \$1.935
Less ton lots ..	2.01 2.023 2.055

Nickel—Boron	
15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.	
Less ton lots ..	\$2.10 \$2.1125 \$2.1445
Silcaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
carload lots ..	25¢
Ton lots ..	26¢
Silvaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots ..	58¢
Ton lots ..	59¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.	
No. 1 ..	87.5¢
No. 6 ..	60¢
No. 79 ..	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per pound ..	45¢
Less ton lots, per pound ..	50¢



PRODUCTION OVERHEAD

Avoid the Red Shadow . . .

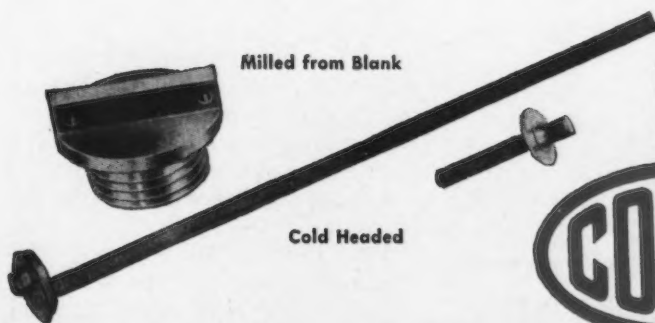
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NEWS OF INDUSTRY

French Cabinet Decides To Boost Imports To \$1.5 Billion In Year

Paris

• • • The French Cabinet has examined the 1946-47 import plan and decided that for the year beginning July 1, 1946, France's imports will total \$1594 million. This total will be divided as follows:

	Second half 1946 (Millions of dollars)	First half 1947
Ministry of Agriculture...	30	35
Ministry of Food.....	41	60
Ministry of Reconstruction	5	5
Ministry of Public Health	3	22
Ministry of Industrial		
Production	440	482
North Africa	40	50
Other colonies	50	96
Coal	60	60
Tobacco	2	13
Execution of commercial		
agreements	40	60
Total	711	383

These figures are quoted on the basis of the present plan, and should the program be altered in any way they are liable to revision. No details have yet been given regarding the amounts of imports from individual countries.

Important orders are already reported to have been given to American firms, representing three quarters of the credits obtained which total about \$2 billion. The French Government is waiting on financial aid from the International Reconstruction Bank to obtain dollars necessary to increase imports of raw material, plant and equipment for the modernization program.

According to a statement by M. Leviant, president of the Economic Committee, more than one third of the last American credit of \$650 million obtained in May of this year has been used already, as well as the whole of that secured in December last which amounted to \$550 million. About \$750 million have been spent on machines and railway and farm equipment, although so far only 6 pct of these orders have been delivered. Officials of the French purchasing commission in Washington are placing new orders, and it is believed that the credits at present available will soon be exhausted.

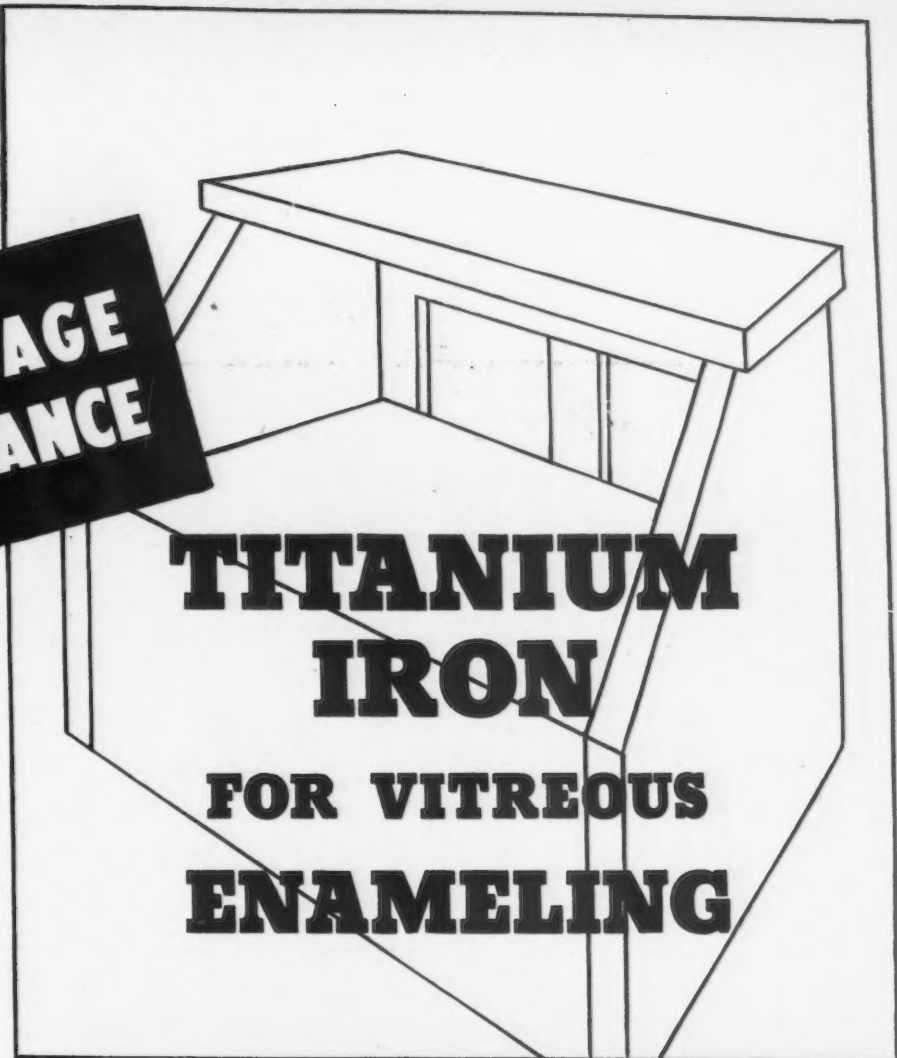
The French Minister of National Economy, M. de Menthon, in describing the plan stressed that it is divided into two distinct sections; an equipment plan and a raw material supply plan. Fi-

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Further information is available upon request.



**TITANIUM
IRON
FOR VITREOUS
ENAMELING**

EFFECT OF GAGE AND COMPOSITION ON SAGGING RESISTANCE	
GAGE AND COMPOSITION	DEGREE OF SAG IN %
24 Ga. Standard Enameling Iron	100
24 Ga. Titanium Steel	57
18 Ga. Standard Enameling Iron	100
18 Ga. Titanium Steel	18

The Titanium Alloy Manufacturing Company produces the titanium alloy used in the manufacture of this steel. For samples of this steel, see your steel supplier. Pending patent applications on the new enameling process and products made thereby are owned jointly by Inland Steel Company, and The Titanium Alloy Manufacturing Company under trust agreement.



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nancial resources are already secured, in connection with the equipment plan, to complete the orders given since the liberation, amounting to about \$1 billion. During the coming year new orders will be given for about \$350 million, and equipment coming from the "surplus" and from reparations for the period 1946-50 is estimated at \$500 million.

The raw material supply plan covering the year commencing July 1946 will involve a \$1500 million expenditure, according to M. de Menthon, and the figures given for the 1946-47 program refer to the raw material supply and not to the equipment plan. As a good harvest is expected this year, food imports could be limited to only 10 pct of the total; the main effort will be devoted to industrial raw material. M. de Menthon said that imports in connection with industry have been calculated to bring the 1947 output up to that of 1938. Imports in the 1946-47 plan in order of importance will be textile raw materials, ores and metals, raw materials for the chemical industry, paper and oil. Allocations of gasoline have already been reduced to administration and military services.

As far as coal is concerned, the Minister underlined the progress made in July owing to increased imports of American coal. During that month 1,180,000 tons of coal were imported from abroad, compared with approximately 660,000 tons in May and June following the strikes in the United States. An agreement has been signed with the American Government for the delivery of an additional 275,000 tons of coal per month.

The Minister concluded by emphasizing the necessity to export so as to pay for these imports. An export target of \$600 million has been fixed for 1946, and \$500 million for the first half of 1947.

Reports of Exporting French Cars to U.S. Raise Strong Outcry

Paris

• • • Strong complaints are being voiced here as a result of reports from New York concerning the export of Renault automobiles to America. The French domestic market is being largely ignored by

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ELECTRIC STEEL CASTINGS

the government in a drive to obtain foreign exchange (four cars exported to every one retained). The official French Government position recognizes the keen world demand for automobiles as a transient factor, and is anxious to sell as many units as possible, particularly where dollars can be obtained for them, before Detroit spoils the fun with deliveries.

The traditional product of the French motor car industry being long on fuel economy is particularly in demand in this transition period, but the increasing British emphasis on exports of low-powered models will make competition in this line about as tough as against Detroit in the larger car field. British deliveries are also hampered by limited production at present.

A recent statement by the French Minister of National Economy revealed that automobiles are currently making up about 4 pct of French exports. Prices are said to be about equivalent to British, but about 25 pct above American levels. French export prices are considerably higher than the controlled domestic ceiling. General consensus of opinion is that the domestic price is below existing production costs. The difference between home and export prices is currently making up losses incurred in selling the 20 pct of production to priority buyers in the home market.

While the wrangle goes on in the press concerning the allocation of passenger car production, the government and the industry here are pushing efforts to increase production of trucks. July truck output totaled 6019, compared with an average 1938 production of 3260. The July figure for passenger cars was 2709, compared with a monthly average of 15,200 in 1938.

During the first six months of 1946 exports amounted to 10,435 units, of which 5576 were passenger cars and 4453 were trucks. The principal buyers from the French industry were Belgium, with 2640 units; Sweden, 124; Switzerland, 108; Algeria, 109; Morocco, 70.

In the same period France imported 11,477 units, of which 10,464 were trucks and 637 passenger cars. U. S. A. furnished 4432 units, Canada 4548, and Great Britain 2119.

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PITTSBURGH 30, PA.

THE IRON AGE, September 12, 1946—139

ANNOUNCEMENT

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ACP is now in position to exploit and develop further its patented ACP COLD SPRAY-GRANODINE (peroxide-zinc phosphate) coating process. Already many of our former customers have re-adopted it, and more are planning to change in the near future to get the savings of this low temperature process that produces a hard zinc phosphate bonding coating on which the highest paint luster can be obtained. It protects the lustrous beauty of the paint finish—and the metal as well. A GRANODIZED product gives assurance of the quality of the paint finish.

Another ACP product—THERMOIL-GRANODINE—is again available to produce wear resistant phosphate coatings on friction bearing surfaces.

Quality products that are "GRANODIZED" with ACP COLD SPRAY-GRANODINE; "DURIDIZED" with ACP DURIDINE 210B; or "CROMODIZED" with ACP CROMODINE are *Certified for Rust Resistance*

AMERICAN CHEMICAL PAINT COMPANY



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AMBLER, PA.



WALKERVILLE, ONTARIO

140—THE IRON AGE, September 12, 1946

NEWS OF INDUSTRY

Quarter Mile Long Electric Catapult Launches Navy Planes

Pittsburgh

An electric "motor" more than a quarter of a mile long and mighty as three of the most powerful passenger locomotives is the latest scientific answer to the problem of launching jet-propelled and robot planes and heavy bombers from shipboard or small landing fields without the initial slamming shock of conventional catapults.

This was disclosed with Navy Department permission by engineers of the Westinghouse Electric Corp. who developed and built the new device, called the "Electropult," for the Navy.

In operation a plane is hitched to a small car which, at the launching signal, speeds down a "road-bed" and catapults the plane into the air. In recent demonstrations at the Naval Air Test Center,

The "Electropult" is illustrated on p. 99 of THE IRON AGE issue of Sept. 5.

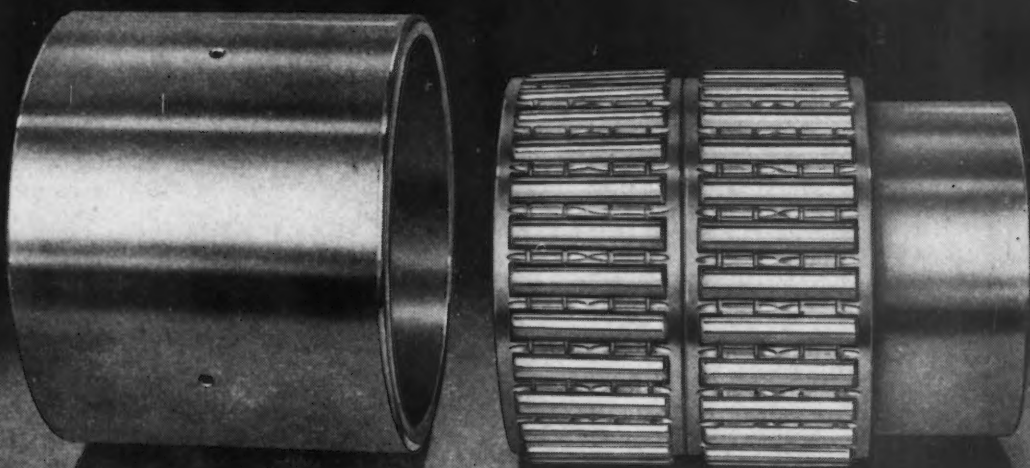
Patuxent River, Md., the Electropult launched a jet-propelled fighter at 116 mph in 4.1 sec after a run of only 340 ft. Without assistance the plane would have required a run of about 2,000 ft to take off. Running free, without a load, the car has built up a speed of 226 mph in slightly less than 500 ft.

Looking somewhat like a miniature trolley system, the Electropult is essentially a big electric motor—called a linear motor because it delivers power in a straight line instead of with the rotating pattern of the usual motor. What would normally be the rotor, or rotating part, is, in the linear motor, the stationary part, laid out flat along the ground to form a 1382-ft-long "roadbed" or track for a small shuttle car. In the car are installed the coils and steel cores normally found in the stator. If fashioned into the usual circular form this motor would be 440 ft in diameter, making it easily the largest electric motor in the world.

Originally designed to launch planes from the small "stepping-stone" islands of the Pacific, the Electropult was in the process of construction when the war against Japan ended. Its development, however, opens up enticing possi-

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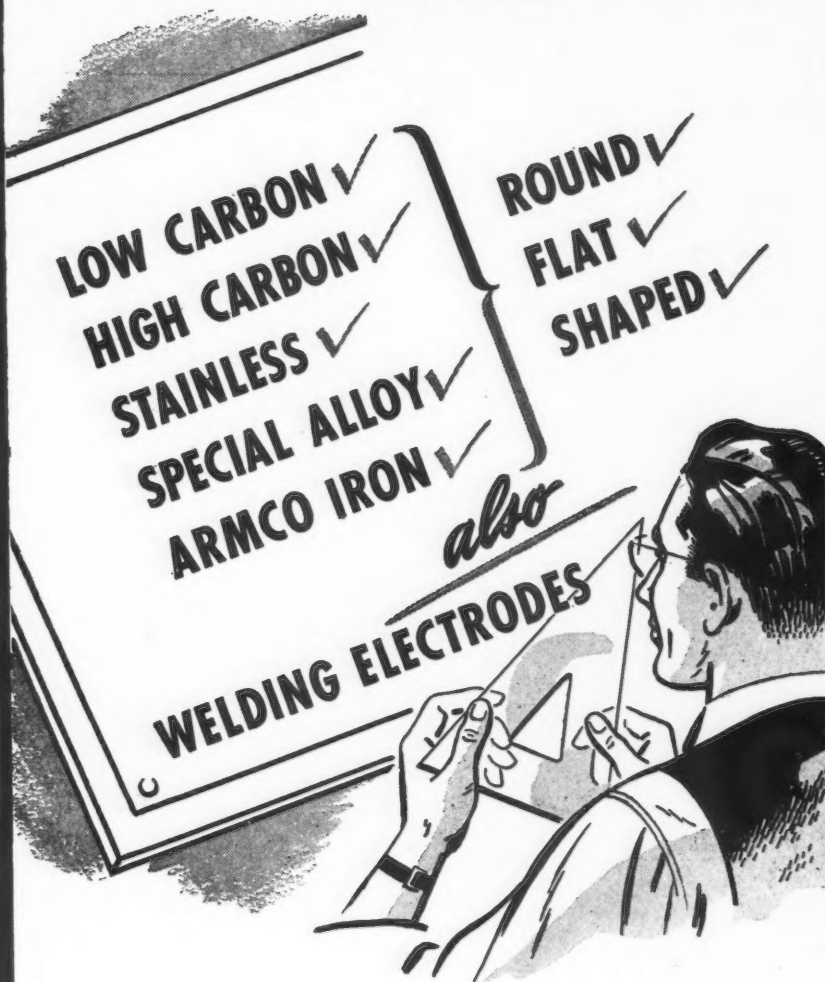
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NEWS OF INDUSTRY

bilities for the future both in military and commercial aviation, commented M. F. Jones, of the Westinghouse transportation engineering dept., who, as project engineer, was in charge of the design of the equipment.

"The electric catapult, for example, has no apparent limitations in speed or capacity within the range of requirements which are now foreseen," said Mr. Jones. "It gains in effectiveness as the size of the aircraft increases. With the ever-increasing speed and weight of aircraft it seems reasonable to expect that electric catapults eventually may become the natural choice for the larger sizes of aircraft carriers."

Looking to the future, Mr. Jones said, designs have already been completed for an electropult capable of launching the largest existing airliners at 120 mph with a take-off run of 500 ft. Such airliners now need a run of about 4,000 ft to accelerate to flying speed. Maximum acceleration would be about 1"G which would be built up during the first two seconds of the take-off run, the engineer explained. This means that a passenger would be pressed back into his seat by a force about equal to his own weight, he said, adding:

"We are convinced that seated passengers would not find this acceleration objectionable. As a matter of fact, it wouldn't be any more uncomfortable than lying in bed for a few second with your feet propped up in the air."

Other Prospects

Mr. Jones listed these other possibilities for the electric catapult:

1—Floating airports, or sea-dromes, for refueling in mid-ocean. Equipped with catapults these may take somewhat the form of aircraft carriers.

2—Barge type airports at the water front of cities having suitable water areas near the business district.

3 — Mid-city airports. Slum elimination projects may be combined with the airport development. The "flight-deck" could be elevated several stories and the space below used for all purposes except take-off and landing operations.

4—Reviving outgrown airports. The trend to larger and faster aircraft requiring longer and longer runways may lead to many situa-

tions where it is impractical to extend the runways.

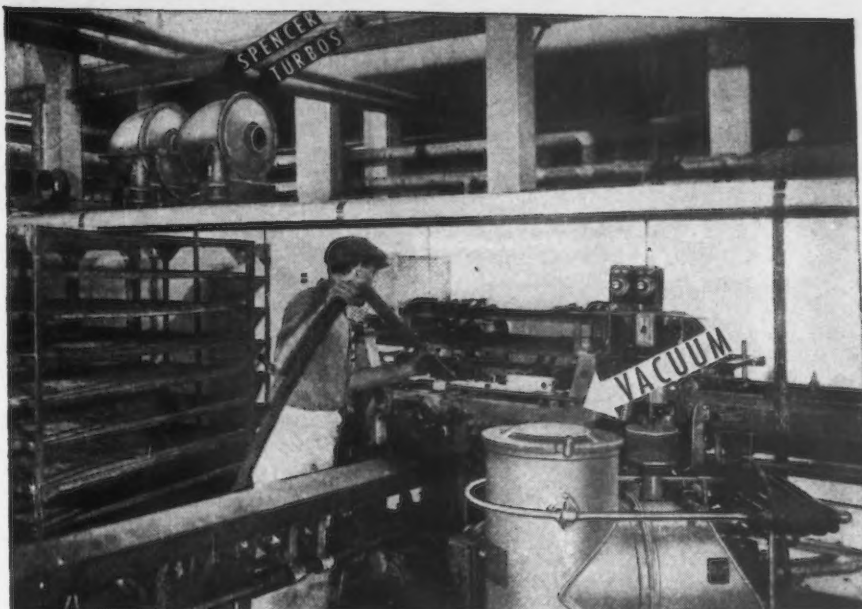
"Economic justification, rather than design problems, will govern the use of the Electropult in commercial aviation," declared Mr. Jones. "We know how to build the apparatus now and we know just what it can do. In conjunction with mid-ocean seadromes, for instance, it would enable a plane to carry a smaller supply of gasoline and a larger pay-load. That, of course, means greater income on each trip."

Two Electropults have been built for the Navy, Mr. Jones said, the first at Mustin Field, Philadelphia, and the second at the Patuxent River Base. The latter is the more advanced model although both are fundamentally the same. The Westinghouse engineer gave these details of the Electropult:

At Patuxent River the Electropult is installed on a 2800 ft-long concrete runway, 100 ft wide. Down this runway runs the track mounted flush with the ground above a concrete trench. More than 300,000 electrical steel sheets are used in making the track core. Nearly 17,000 high resistance metal bars are fitted into slots in the steel core, like rungs on a ladder lying flat along the ground. Sunk into the ground on both sides are rails to carry the shuttle car, while the copper bus bars to carry current to the motor are installed in the concrete trench.

The shuttle car itself presents a somewhat turtle-like appearance, belied by its tremendous speed. It is 11½ ft long and 3½ ft wide and car extends only 5 in. above the track. With its black and yellow striped top it looks much like a giant bug scurrying back and forth at breakneck speed at the beck and call of the operator at the control panel.

To harness the plane to the car a steel cable "bridle" is used, with the center passing around a lug on the top of the car and the two looped ends hooked over projections on the underside of the plane's wings. The plane rides along the track on its own wheels and when flying speed is reached the car stops suddenly, the bridle drops off and the plane takes to the air. Through a system of relays towing power of the car can be interrupted at any predetermined point along



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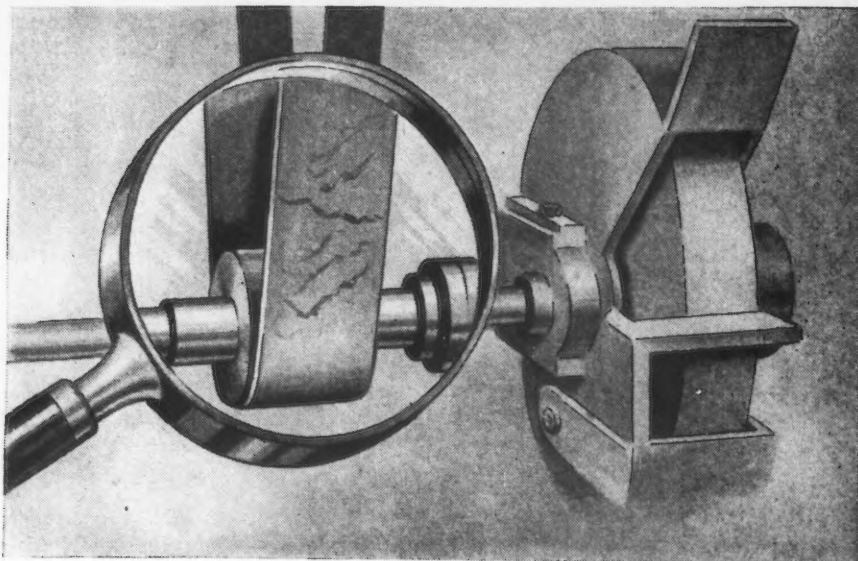
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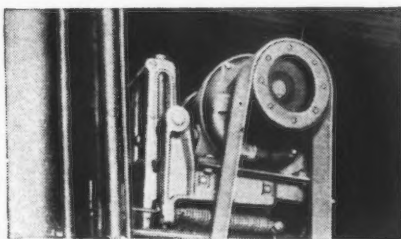
the case of the grinder killer

The cause for shutdowns on a grinder in a North Carolina Machine Shop was no mystery. Operating conditions killed the belt . . . a quarter-turn drive . . . torturing flexes . . . splashing oil and water tore belts to shreds in a matter of weeks. The *real* mystery was—What to do about it!

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the track by cutting off the supply of electricity.

The Electropult carries along its own power supply in this case housed in a sunken concrete vault beside the runway. A Pratt & Whitney 1100-hp aircraft engine starts the cycle. This engine drives a direct current generator which is hooked to a direct current motor. This motor, in turn, drives an alternating current generator, connected to a 24-ton steel flywheel. Starting slowly and working up to a speed of 1300 revolutions per minute, the flywheel develops tremendous potential power. At take off the direct current members of the "team" are dropped out and the spinning flywheel provides the power to drive the AC generator and supply the burst of electricity that sends the plane on its way.

Mr. Jones explained that 12,000 kilowatts of power is transmitted to the car during the few seconds it takes to launch a heavy plane into the air. This, he said, approximates 15,000 hp—equal to the straining might of three of the most powerful railroad passenger locomotives.

Reports Registrations For Cars Fall Sharply

Detroit

••• New passenger car registrations for the first six months of 1946 equalled 20.06 pct of registrations for the same months and states in 1941, according to a recent report released by R. L. Polk & Co., statisticians for the automotive industry.

Registrations for the first half of 1946 cover all states except California and Pennsylvania.

During the first six months of 1941, the last previous year of normal car production, a total of 2,085,495 new passenger cars were registered in states in which less than half a million new cars were titled during the first half of this year.

Truck registrations made a much more favorable showing, totaling 65.1 pct of 1941 prewar registrations for the month of June. Reports from 48 states—California excepted—for June show 227,995 registrations as compared with 349,849 for the same month and states in 1941.

Truck figures for July were 245,969 units as compared with 375,990 for the same states for July 1941.

Nelson Reveals Basic Struggles Between WPB And Military in Book

New York

••• In his book, "Arsenal of Democracy," published last week, Donald M. Nelson lifts the iron curtain on an attempt to remove him as head of the WPB on the part of Army, Navy and then War Mobilization Director James F. Byrnes.

It was this attempt of the military to gain control of the national economy that hampered reconversion, Mr. Nelson charges. He accuses the Army of creating a "production crisis" during the final stages of the war which while it failed to solve any output problems did succeed in "driving a wedge between soldiers and civilians and diverting attention from the Army's own miscalculations."

Mr. Nelson goes on to warn the nation that the War Dept. is in the process of becoming one of the "most important and influential branches of our government, and that the question of military control will confront us not only in war but in peace."

"The lesson taught by these recent years of war is clear," Mr. Nelson continues, "our whole economic and social system will be in peril if it is controlled by the military men."

In the summer of 1944 the "long and bitter controversy with the military over the control of America's civilian economy . . . to a large extent . . . was lost," Mr. Nelson writes. "This upheaval was touched off by his efforts to pave the way for reconversion, which the Army felt would interfere with the armaments effort."

"To a large extent the Army took control over the economy, and many of the reconversion difficulties which arose later, after Germany and Japan had finally been knocked out, can be traced directly to that fact," he said.

"The Army was, quite openly, out to protect war production by the simple means of creating pools of unemployment," said Mr. Nelson.

This was the issue which divided the WPB itself, resulting in the resignation of both Donald Nelson and his chief assistant,

Is this **YOUR** coolant problem?

CASE HISTORY #1

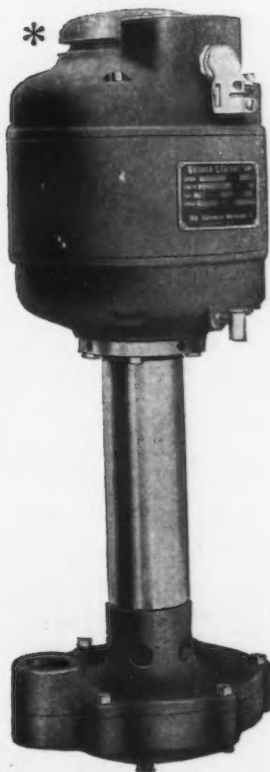
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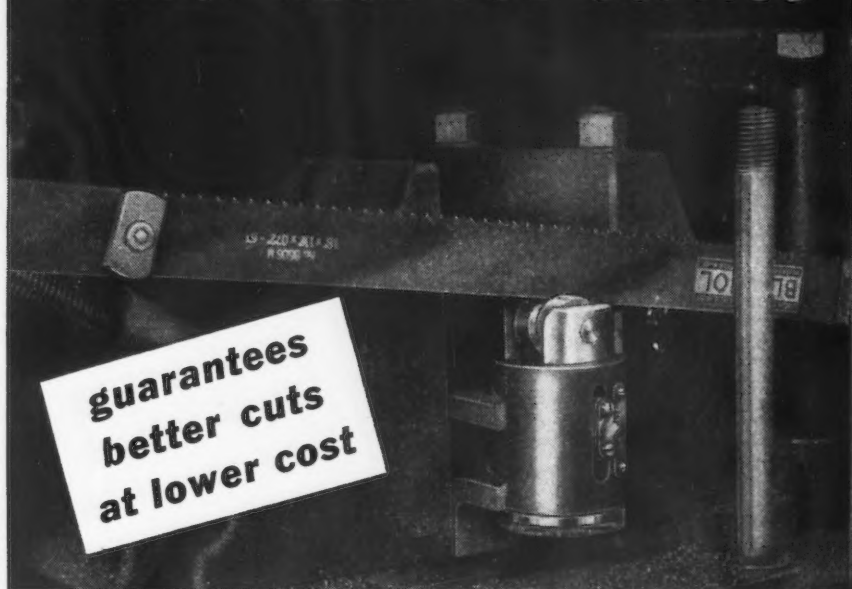
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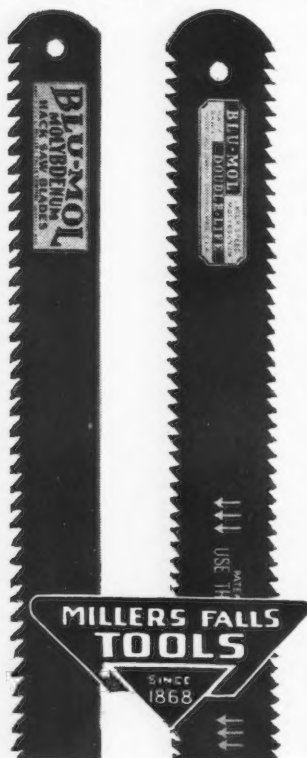


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Millers Falls *complete* power Hack Saw Service also includes the Tensiometer, a gauge which applies and maintains proper blade tensions from 0 to 4000 lbs. regardless of blade temperatures, eye elongation or blade stretch. Both instruments, used with the handy Calculator, guarantee the best possible performance from your power hack saw blades. Although this service is designed for use with *any* blade, you are assured best cutting results with Blu-Mol High Speed Molybdenum Blades, single or double edge.

Ask us for further information on this triple-combination that rounds out an exclusive service. We'll gladly give you a demonstration on your own machines that will show surprising, money-saving results.

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C. E. Wilson, in a final showdown which left the WPB in the hands of J. A. Krug, who is now Secretary of the Interior.

The former WPB head described as "pitiable the things said and done by a few of the men at the top of the Army supply services," then headed by Gen. Brehon Somervell, "things said and done in either an inexcusable lust for power or in outright ignorance of how industrial production is accomplished and what it is necessary for an economy to produce."

This new book, which is Mr. Nelson's record of the staggering production job which was the backbone of the Allied war effort, is interwoven with a story of conflict between the WPB and the Army, a conflict whose existence Mr. Nelson usually denied in the years it went on behind the scenes.

At the peak of one flare-up in February, 1943, touched off by Mr. Nelson's effort to schedule arms production as well as to regulate materials, he revealed that he got word the "Army was determined to have me fired that very day."

An assistant informed him that a letter had been drawn for President Roosevelt's signature, naming Bernard Baruch as the WPB chairman and appointing Ferdinand Eberstadt as deputy. Mr. Eberstadt, a New York investment banker and former director of the Army-Navy Munitions Board, recently had been put into the WPB as a vice-chairman and espoused the Army viewpoint.

A meeting was set in Mr. Roosevelt's office at 2 p.m., Mr. Nelson said he was informed, at which Mr. Byrnes, Secretary of War Stimson, Secretary of the Navy Knox, Under-Secretary of War Patterson (now Secretary), and Under-Secretary of the Navy Forrestal (now Secretary) would ask the President to sign the letter.

Mr. Nelson verified the report through Mr. Stimson, he said, then immediately discharged Mr. Eberstadt and announced the appointment of Charles E. Wilson, president of General Electric, as his executive vice-chairman with full charge over WPB operations.

"A great commotion ensued, and, as far as I know, the meeting that was scheduled for the President's office that afternoon did not take place," Mr. Nelson wrote. The Army submitted to WPB scheduling of war production.

Canadian Survey Shows Industry Reconversion Nearly Accomplished

Ottawa

...As a result of a survey by the Economic Research Branch of the Dept. of Reconstruction and Supply of 643 major plants formerly engaged in war production, it has been determined that the technical reconversion of Canadian manufacturing industries has been largely accomplished with comparatively little dislocation. Reconversion of productive facilities of manufacturing industries formerly engaged in war production was about three-quarters complete in August, one year after VJ-Day, and by the end of the present year reconversion is expected to be about 90 pct completed, and fully accomplished by the spring of 1947.

In addition Canadian industry has prepared programs of modernization and expansion designed to make it more efficient, to serve better the domestic consumer and strengthen the position of Canada in international trade. At the same time the large investment program planned by industry held promise of maintaining a high level of employment and income for the country in this and the coming year—unless seriously interfered with by strikes and shortages of materials.

The survey indicates that during the first postwar year manufacturing industries have shown a vigor not unlike that demonstrated during the war years. Since the survey included primarily firms which were major war contractors, the coverage is much higher in the heavy producers' goods industries than it is in most of the consumers' goods industries. It can be considered to provide a representative sample for a number of important industries taken individually but cannot be regarded as completely representative of progress in all manufacturing industry.

The questionnaire which formed the basis of the survey was sent to 650 plants. Of these 643 were able to provide the desired information. These firms employed about 380,000 people at that time, or a little under 40 pct of the total employment in manufacturing. The

Boeing Aircraft Company treats bomber dies with **TECTYL**

When placed in permanent storage, the large and costly dies, used in B-17 production, must be thoroughly protected against rust and corrosion. For this important purpose, Boeing Aircraft Company (Seattle and Renton, Washington) sprays them with Tectyl 506.

The Boeing Aircraft Company uses other Tectyl compounds—for instance Tectyl 508 to protect dies placed in temporary storage. This Tectyl treatment provides needed lubrication when the dies are returned to service.

Tectyl is used on huge dies such as those required for fuselage and tail sections. →

Large dies for B-17 are sprayed with Tectyl to protect against rust and corrosion in permanent storage.

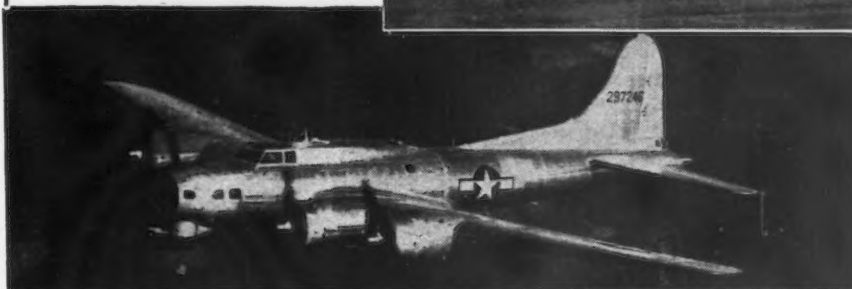
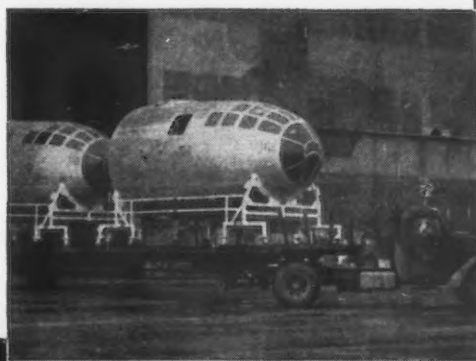


Photo Courtesy Boeing Aircraft Co.

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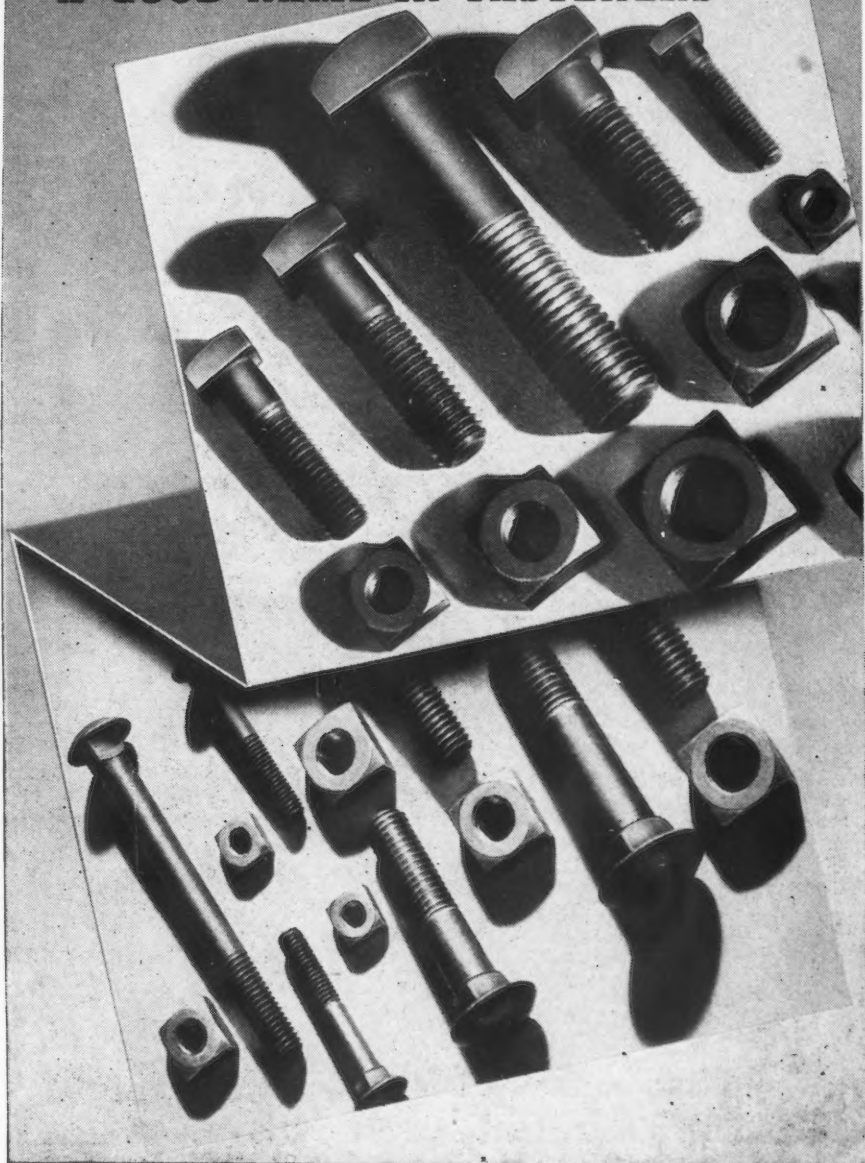
Tectyl can be sprayed, brushed or flushed on, or parts can be dipped. Tectyl need not be removed for inspection of surface—leaves ideal surface for painting. Tectyl can be removed easily at any time with kerosene. For detailed information, write, stating type of rust problem encountered in your plant.

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survey includes most of the larger plants in which major reconversion of production facilities was necessary except for some 100 war plants which had been either temporarily or permanently closed down since the end of the war. Nearly all of these latter are government-owned plants of which about one-quarter are being retained by the government while a large majority of the other three-quarters has already been sold or is under negotiation for sale.

No allowance is made in the survey for the reconversion required to bring these plants into production on a peacetime basis. Not less than half of the firms surveyed indicated that they were embarking on programs of modernization and expansion of their productive facilities in the post-war period. Of these, three-fifths have already completed their programs or expect to do so by the end of this year. Most of the remaining companies expect to complete their modernization and expansion programs in 1947, though some have longer range projects extending into 1948 and 1949.

In spite of the magnitude of the manpower shift in the first post-war year, that is between June 1, 1945 and June 1, 1946 when approximately 620,000 servicemen had been discharged and 720,000 persons released from war work, the number of unemployed was kept surprisingly low. It never reached more than about 270,000 out of a total working force of close to 4.8 million. The peak level of transitional unemployment was reached in March, and by this month, as the forces of expansion grew, unemployment had declined by 100,000.

The answers received enabled the Economic Research Branch to produce a study of conditions showing the overall progress of reconversion, modernization and expansion in manufacturing industries, the progress made by individual industries, broken up into four categories, i.e.: (1) Nondurable consumers' goods; (2) durable consumers' goods; (3) producers' goods; (4) basic materials; and the progress by geographical areas. The report also contains summaries of reconversion by industries, by major regions and by major industrial centers.

The survey showed that a little over half of the plants with recon-

version still in progress expected to complete it by the end of August and four-fifths expected to do so by the end of this year making nine-tenths of all the plants engaged in reconversion. Three-fifths of the plants that were engaged in reconversion activities were being retarded by various shortages, the most important of these being delays in securing machinery and other equipment. The estimates are subject to correction in the light of development of labor-management relations.

Extensive strikes, such as the steel strike, may cause further considerable delays not accounted for in the estimates given. A little under half of the reporting plants had postwar plans for modernizing or expanding their facilities. Modernization programs were being undertaken in two-fifths of the plants and expansion programs in one-third of the plants. Half of these with programs in progress or in the planning stage expected to complete them by the end of 1946 and three-quarters to do so by the end of 1947.

Supplementary evidence adduced subsequently indicates that a portion of the investment that was planned for 1946 has had to be deferred to 1947 because of material shortages and labor difficulties. A little under half of the plants with modernization and expansion programs in progress were being retarded by shortages as compared with three-fifths in the case of reconversion. The most important retarding factor was delay in obtaining machinery and other equipment. The other main cause of delay was lack of materials and parts, chiefly building materials. Shortages of labor were relatively less important than in the case of reconversion.

As a result of reconversion, modernization and expansion programs, the firms covered expected not only to maintain their employment but even to increase it—although the increase was small—namely 3.4 pct over the May 1 level. On examination, however, it is found that these proportions understate somewhat the employment-creating effects of postwar expansion. The bulk of the increase is expected to result from programs of modernization and expansion and little is due to re-



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conversion. A little over half of the total increase was reported by plants which expected to complete their modernization and expansion programs by the end of 1946, but present indications are that this increase will not be realized fully because of the retarding effects of labor unrest and material shortages.

Among the major industrial groups the number of plants requiring reconversion was proportionately greatest in the durable consumers' goods group, such as automobiles, radios, washing machines; somewhat higher than the overall average in the producers' group, such as structural steel, agricultural implements, railway rolling stock; and relatively low in the nondurable consumers' goods (food, primary textiles, clothing) and basic materials group (base metals, rubber, pulp and paper).

The degree to which reconversion was required was greatest among plants formerly engaged in war production but now turning to the production of automobiles, electrical apparatus, boilers and

heating equipment, radio and domestic appliances. The incidence of modernization and expansion was highest in the durable consumers' goods group, mainly due to the need for these industries to introduce new technical devices and production methods which they were unable to adopt during the war. Most of the industries in the producers' goods and basic materials group expanded greatly during the war years. Their main problem now is the consolidation of their wartime gains.

In the agricultural implements, plumbing supplies, household furnishings, domestic appliances, radio and primary textile industries, the incidence of modernization and expansion was highest, while it was lowest in the aircraft, railway rolling stock, shipbuilding and base metals industries. The number of plants being retarded by difficulties in securing machinery and materials was proportionately highest in the clothing, agricultural implements, primary textiles, pulp and paper, electrical apparatus and radio industries.

Chapters of AFA Hold Election of Officers For 1946-47 Period

Chicago

• • • Chapters of the American Foundrymen's Association have elected the following officers for 1946-47, Sheldon V. Wood, president of the technical society, announces:

Birmingham Chapter

Chairman, T. H. Benners, Jr., managing partner, T. H. Benners & Co., Birmingham; vice-chairman, W. E. Jones, chief engineer, Stockham Pipe Fittings Co., Birmingham; secretary treasurer, Fred K. Brown, sales manager, Adams, Rowe & Norman, Inc., Birmingham.

Canton District Chapter

Chairman, I. M. Emery, works manager, Massillon Steel Castings Co., Massillon, Ohio; vice-chairman, C. F. Bunting, foundry metallurgist, The Pitcairn Co., Barberton, Ohio; secretary, C. B. Williams, melting foreman, Massillon Steel Castings Co., Massillon, Ohio; treasurer, Otis D. Clay, owner, Tuscora Foundry Sand Co., Canal Fulton, Ohio.

Central Illinois Chapter

Chairman, Zigmond Madacey, foundry superintendent, Caterpillar Tractor Co., Peoria, Ill.; vice-chairman, A. V. Martens, president, Pekin Foundry & Mfg. Co., Pekin, Ill.; secretary-treasurer, C. W. Wade, training supervisor, Caterpillar Tractor Co., Peoria, Ill.

Central Indiana Chapter

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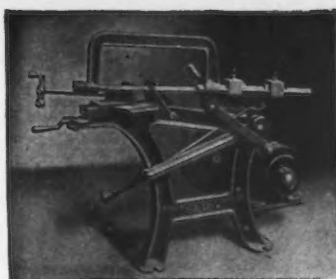
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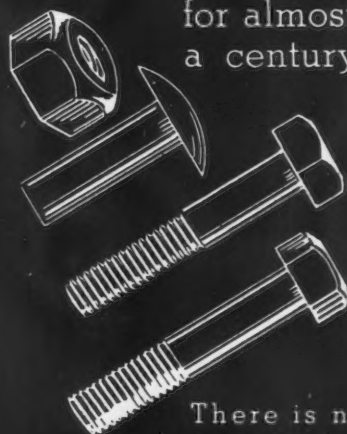
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Wisconsin Chapter

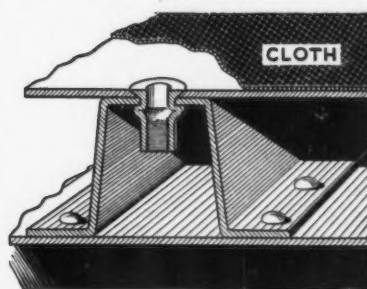
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Gallup Polls

(CONTINUED FROM PAGE 115)

try issued simultaneous statements calling upon Congress to balance the budget for 1947.

A recent announcement by President Truman estimated the deficit for the fiscal year ending June 30, 1947, at \$1,900,000,000.

Meanwhile, on the tax cutting issue, Representative Harold Knutson of Minnesota, a Republican, has issued a statement calling for a 20 pct cut in income taxes for the coming year.

Chrysler to Discuss Wage Increase With United Auto Workers

Detroit

• • • In accordance with provisions in the Chrysler-UAW-CIO contract, the company has agreed to start discussions with the union in 60 days on the matter of a general wage increase.

The company's decision was made known in a letter from Robert W. Conder, director of labor relations, Chrysler Corp. to Norman Matthews, national Chrysler director.

In replying to Mr. Matthews, Mr. Conder took exception to several statements contained in a letter released to the press on Aug. 20, by the national Chrysler director.

"You say that when we negotiated the 18½¢ per hr general wage increase last January 'the national Chrysler dept. of the International Union refused to sign an agreement which would freeze wages for a definite period of time.' You told us you could not negotiate the wage agreement for a definite period of time because the International Union would not approve such an agreement. Yet soon afterwards the International Union did approve contracts with competitors of ours freezing wages for a year or more."

Replying to the union's contention that it did not fight to obtain more money in the latter part of 1945 but was struggling to achieve more purchasing power, Mr. Conder said, that all through the war the union asked for general wage increases, wage adjustments and

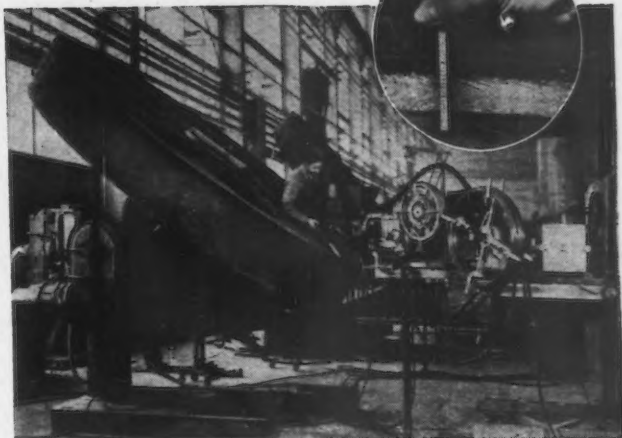
The Job: To weld the web plates to rim and hub on each side of a 12 foot turbine reduction gear... with speed, to meet the weld quality specified by the American Bureau of Shipping and the ASME.

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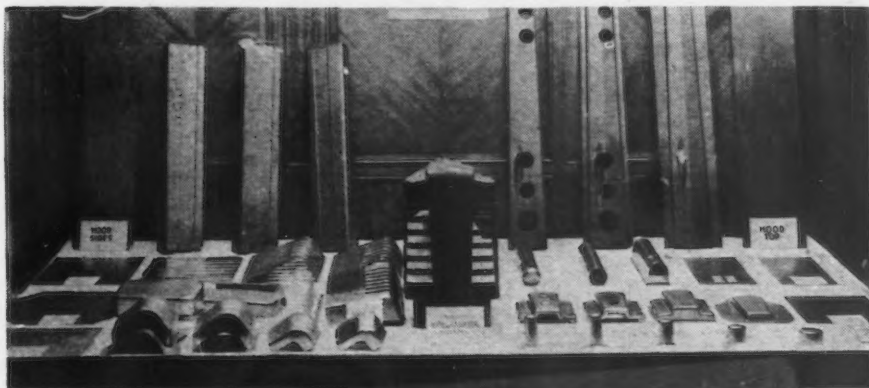
The Result: Fully automatic welding which produced a clean, high quality fillet 1½ in. across the face (see inset) and 36 ft. in length in one pass. No machining or spatter removal was necessary.

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THE IRON AGE, September 12, 1946—155

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cost of living adjustments, and that these demands for more money were culminated on Aug. 20, 1945 when the union formally demanded a 30 pct general increase in wages. This was still the principal issue, the company said, when the Chrysler contract was terminated on Dec. 5, 1945.

The union had contended that its battle was not to take more money home, but to be able to buy more with the dollar. Commenting on this phase of the union demands, Mr. Conder said that Chrysler had repeatedly tried to get the union's representative to see that their demands would lead inevitably to higher prices.

"The way to more purchasing power" Mr. Conder said, "is through producing more. The best curb on prices is the competition for buyers resulting from a high production of goods for sale.

"We do not believe there should be either another round of wage increases at this time or another round of strikes," Mr. Conder concluded. "We hope your union will consider further and avoid the mistake time has shown it made at the end of the war."

Motor Wheel Reports Profit of \$408,592

Lansing, Mich.

• • • Motor Wheel Corp. has reported a net profit for the first six months of 1946 of \$408,592. The six months' period showed an operating loss of \$225,407, but tax refunds arising from carrybacks amounting to \$634,000 resulted in a net profit of 48¢ per share.

Net sales for the period totaled \$11,246,026 compared with \$28,368,299 for the similar period ended June 30, 1945.

For the 12 months ended June 30, 1946, Motor Wheel net earnings amounted to \$993,756. Actual operating loss for the year was \$80,243 and refunds arising from carrybacks totaled \$1,074,000.

According to C. C. Carlton, vice-president-secretary, business on the company's books is considerably more than double than for any other peacetime period in the corporation's history. Material shortages, he said, "have been the controlling factors in the company's production for the last quarter."

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London Economist

(CONTINUED FROM PAGE 117)

visions provide safeguards against "squeezing" of profits.

The future course of prices depends on many factors. The first orders issued by the partially revived OPA authorized price increases on many commodities. Similar action will almost certainly be taken in other cases, as for example newsprint and lumber, imported from Canada, which are affected by the upward revaluation of the Canadian dollar. An authorized increase in pig iron prices indicates that the effects of some wage increases last spring are now going the second round. A reflection of the government's belief that a complete rollback of prices is impossible—and perhaps undesirable, since it might revive black markets—is found in the 1 pct monthly allowance made by President Truman to meet rising prices in his revised estimate of government spending for the fiscal year 1947.

On the other hand, there are considerations which are operating to hold prices down. With a huge wheat and corn harvest in prospect, prices of these and other farm commodities seem due for some reaction, particularly if UNRRA buying also tapers off. Although Civilian Production Administrator Small reported last week that the only possibility for increased production lay in increased productivity, the volume of manufactured goods supplies coming on the market should exceed current production when the large volume of semifinished goods, which has accumulated in the last 6 months as the result of strikes and material shortages, reaches final completion. A further factor making for restraint upon prices may be President Truman's order to government departments to practice drastic economies. Finally, consumer demand itself is not unbounded. If price rises for the necessities of life absorb a larger measure of consumers' income, the less immediate demands, such as those for durable consumers' goods, may feel the pinch.

Most important, and completely unpredictable, is the position labor will take. Pressure for additional wage increases at this time, as at

first seemed likely, would further increase the upward pressure on prices. Present indications are, however, that both the American Federation of Labor and the Committee of Industrial Organizations will fight the battle of increasing production during the next several months so that they may live to fight the battle of increasing wages another day. And meanwhile monetary policy continues to be gently restrictive.

Foundry Controller For British Zone Named

London

• • • Arthur Whiteley, formerly managing director of Glanmor Foundry Co. Ltd., and of Thomas & Clement, Ironfounders, Ltd., has been appointed Controller of Foundries in the British zone of Germany. This is the first appoint-

ment to be made in connection with the British Military Government's nationalization of the German iron and steel industry, and involves the supervision of hundreds of German foundries, employing 500,000 workers.

Mr. Whiteley is believed to have been given from eight to ten years in which to bring the foundries to a pitch of efficiency at which they can be handed over to a nationalized German iron and steel industry. He is reported to have said that he intends to employ a control system similar to that which operated in Britain throughout the war.

Correction

• • • The figure 35,826 tons for Canadian imports of nails and tacks in April, which appeared in the July 4 issue of THE IRON AGE, p 105 is incorrect. This figure should be 35,826 lb.

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Iron and Steel Exports Decline, Machinery And Copper Stage Gains

Washington

••• During the first 6 months of 1946, exports of iron and steel registered a decline of about \$25 million as compared with the same period in 1945, according to a summary issued by the Bureau of the Census in conjunction with the foreign trade report for June. Steel plates and sheets were the only semi-manufactures to show a gain.

At the same time, the report showed a sharp rise of \$600,000 in June copper shipments to bring the 1946 cumulative increase to approximately \$2 million.

Highlighting the June report was the fact that industrial machinery accounted for nearly a third of the \$78 million increase in total foreign shipments during the month. It rose from \$70 million in May to \$83 million in June.

Except for the \$13 million increase in machinery, Census said, shipments of finished manufactures in June would have fallen below the May figures. Exports of automotive vehicles and parts also dropped below previous months but the

value of coal shipments rose from \$8 to \$21 million.

Total domestic exports for the first half averaged \$772 million a month, Census said. This is more than three times the prewar average of \$236 million for the 1935-39 period.

While finished manufactures were nearly 3½ times the prewar amounts, exports of crude materials and semi-manufactures showed a lesser increase of 2 and 1.7 times, respectively.

States Truck-Trailer Industry Will Exceed Goal of 60,000 Cars

Washington

••• The truck-trailer manufacturing industry this year will exceed an unofficial goal of 60,000 vehicles, thereby setting a peacetime production record for any year in the history of the industry, according to Julius L. Glick, president of the Truck-Trailer Manufacturers Assn., whose forecast released recently threw a gleam of optimism into a currently drab automotive production picture.

"The goal of 60,000 units is entirely unofficial but was generally adopted by the industry as its

overall aim early this year," Mr. Glick said. "With six-month production figures actually at hand, it now appears certain that the objective will be achieved and surpassed barring drastically changed conditions not presently expected.

Mr. Glick pointed out that in the first six months this year, trailer plants produced 32,974 units—almost equal to the 32,987 civilian trailers built in all of 1945. The six-month production, he noted, witnessed an all time monthly peak of 6691 units for commercial use in April, followed by a near record output of 6617 units in May.

"While suppliers foresee inability to increase present schedules much, if any, for several months," Mr. Glick said, "important sources have told us they can continue past schedules on such items as power brakes, brake linings, wheels, rims, steel tubing, bearings, leaf springs, and axles. The condition is somewhat spotty and some suppliers of those same items are doubtful as to steel supplies and ability to build inventories. Several suppliers expect or are experiencing shortages in nuts and bolts, copper tubing and certain types of sheet and bar steel. One of the possible limiting factors seen by some suppliers is the acute shortage of pig iron vitally needed for castings."

Aluminum Output Resumed

Washington

••• Immediate resumption of operations by Dutch aluminum rolling and pressing mills at Utrecht has been announced here by Netherlands government officials. Output for the present is estimated at the rate of 6500 tons annually.

According to the same sources, the Werkspoor, a Dutch construction company, has completed plans to begin next year the production of all-aluminum motor busses.

During the initial period of production, the Dutch firm plans to import spare parts from the White Motor Co., Cleveland, it was said. After 1948, it is anticipated that Dutch factories will be able to supply the parts.

Sales of the coaches will be handled by a newly organized firm, the White Coach of Holland. It is also intended to produce busses for export.

U. S. EXPORTS OF DOMESTIC INDUSTRIAL PRODUCTS
(Value in thousands of dollars)

COMMODITY	June 1946	June 1945	Cumulative through June	
			1946	1945
CRUDE MATERIAL				
Coal	21,019	18,467	106,723	68,963
SEMI-MANUFACTURES				
Iron and steel scrap	351	239	1,814	997
Steel ingots, etc.	6,251	3,491	34,893	40,122
Plates, sheets, etc.	7,334	6,681	44,712	41,860
Tinplate and taggers tin	3,478	4,357	15,881	30,250
Ferromanganese and other ferroalloys	112	107	1,281	2,447
Aluminum	822	107	2,191	2,168
Copper ingots, billets, plates and rods	1,055	501	8,025	6,076
Brass and bronze	394	406	1,457	12,972
Industrial chemicals	7,120	5,198	44,207	57,131
FINISHED MANUFACTURES				
Iron and steel adv.	14,303	10,071	72,106	56,187
Steel mill mfrs.	16,806	20,364	104,004	128,165
Electrical machinery and apparatus	25,381	23,618	128,509	187,073
Radio apparatus	4,124	6,863	18,121	45,622
Industrial machinery	83,437	58,207	413,036	414,244
Const. and conv.	7,033	8,451	38,406	52,471
Mine, well, pump	10,417	7,092	51,213	43,967
Metal working	17,176	12,179	87,418	96,750
Agricultural	11,967	15,699	67,574	89,149
Automotive, trucks, busses	21,383	38,238	96,220	227,348
Automotive, passenger cars	6,937	28	28,015	454
Automotive parts, assembly	4,213	7,470	23,253	36,685
Automotive parts, repl.	7,618	11,661	42,282	88,576
Airplanes, without engine	10,549	84,492	32,418	512,856
Aircraft engines	1,326	22,009	5,588	102,114

The above table is assembled from statistics provided THE IRON AGE by the Bureau of the Census. Excluded are shipments to the armed forces abroad, shipments between the United States and its territories and possessions, and between the territories and possessions. Figures since July 1, 1945, include shipments to government agencies other than office furniture, equipment and supplies.

French Steel Output Shows Advance During July; Hits 414,000 Tons

Paris

• • • Further increases in French steel production were noted during July as steel output totaled 414,000 tons, compared with 377,000 tons in June. The July production represents 73 pct of the 1938 monthly average (566,000 tons). From a total of 37 blast furnaces in operation in June, 42 were in operation at the beginning of July, and 46 by the end of the month.

Production in the electric steelworks is at a higher level in comparison with 1938 as their power situation is more favorable than those works depending upon coke. Substantial improvements are expected in openhearth production in the near future as some works have already converted to oil. There are isolated examples of plants which are operating at levels far above the industry-wide level. The Montlucon steelworks are reported to be operating at 92 pct of their 1938 capacity.

A new agreement for coal exports from the U. S. to France promises increased tonnages in the coming months, and with the resumption of shipments following the coal strike in America, the French steel industry hopes to have substantially increased supplies of coke from this month. There is some concern noted here about the cost of American coal due to high freight charges, but as long as no other coal can be supplied nothing much is likely to come of this concern.

Agreements have also been signed between France and Poland which will call for the delivery of 110,000 tons of Polish coal per month for the next year in exchange for French automobiles and electrical and mining equipment. Still another French commercial agreement has been negotiated with Czechoslovakia covering the exchange of 110,000 tons of French iron ore, alloy steels, and pyrites for 27,500 tons of Czech coke, tungsten, and some other products.

The modernization committee of the French iron and steel industry, headed by Mr. Roy, manager of the Longwy Steel Co., has

submitted its report. The principal conclusion is that if developed along the pattern outlined the average output per worker would increase from 48 to 88 tons, and the national average fuel saving would amount to 20 pct.

British Main Railways To Convert From Coal Burning to Oil Firing

London

• • • Mr. Alfred Barnes, British Minister of Transport, has authorized Britain's main-line railway companies to proceed as quickly as possible with the government plan to convert 1200 locomotives from coal-burning to oil-firing. It is estimated that when completed the conversion will save over 1,000,000 tons of coal a year.

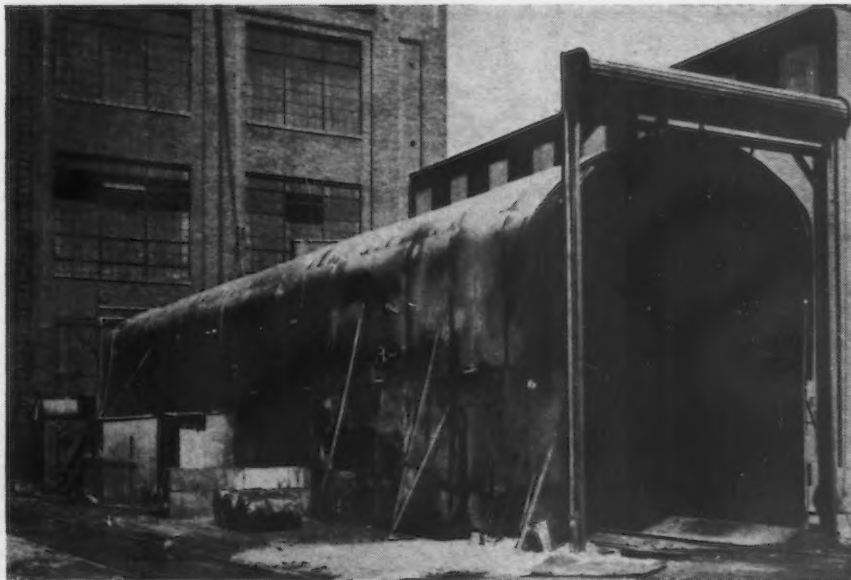
The number of engines to be


converted by the various railway companies are as follows: Great Western 172; London North-Eastern 450; London Midland Scottish 485; Southern 110. Only heavy duty locomotives which consume the largest amount of fuel will be selected for conversion, and it will be necessary to operate them from depots where fuel storage tanks will be installed.

The main features of the plan are equipment to be fitted to the locomotives, storage installations in the locomotive depots, and tank wagons required for transporting the oil from the ports to the depots. The Ministry of Supply is giving all possible help in providing material necessary for equipment and storage tanks. A considerable tonnage of steel will be required, and complete standardization of some of the parts is impossible owing to different types of engines being involved.


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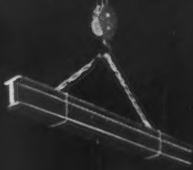
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